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User Research And Persona Building Method In Mobile Games

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Abstract. This research aims to find the determinant of user research and persona building in mobile games to design questionnaire. The method presented in this paper is comparing the similarities and differences of mobile games and PC games to conclude the characteristics of mobile games. Besides, we formulate the principles in cognitive psychology that might guide the design of questionnaire of mobile games user persona. In this study, we conclude that mobile games are easier to operate, interrupted and have limited development of hardware devices and storage comparing with the PC games. In addition, mobile games are easier to begin and need more SNS support. Moreover, this research analyzes the cognition fields for the mobile games in the five sense of people, human ecological perception and human aesthetic perception.

1. Introduction

With the rapidly development of the technologies, games could make casual and interactive entertainment experiences for people wherever in PC or in the mobile. In the 1970s, computer games began to be introduced as a commercial entertainment media. Soon, it became the foundation of an important entertainment industry in Japan, the United States, and Europe. After that, computer games became a billion-dollar industry and could compete with the film industry which can be treated as the most profitable entertainment industry in the world. However, with the rapid emergence of computer games and the fierce competition of major game development companies, a potential and huge market had entered into daily life. In recent years, the wireless communications have developed rapidly at an alarming rate, and the number of mobile phone users has grown into a geometric growth. According to the statistics[1], the number of mobile phone users in China had exceeded 500 million, and it was far more than the number of computer users. The replacement of mobile phone and the performance of hardware were continuously improved. Besides, mobile phone services and value-added services continued to be enriched which led to a result that there was a trend for mobile phones to replace the computers. Therefore, mobile games have become a huge market that cannot be ignored. Lately, the variety of mobile games has become an indispensable carrier for human online entertainment, and various types of entertainment companies were rapidly developing mobile games with the continuous strengthening of 4G networks based on PC games.

Owing to rich and colorful game types gave players more choices, more and more users started to emerge into mobile games. However, the development status of China's mobile game industry was not optimistic. In order to expand the market, the research of user portrait was very important. There were several reasons to work on the field of user portrait. Firstly, user portrait was valuable for the mobile game designers to select the precise market. When the users were labeled with various tags,



advertisers could use their tags to define the users they wanted to perform, which can lead to an accurate advertising. Besides, user analysis was widely used and it was essential for a product. The user researcher needed to understand the user's requirement including the click-through rate, missed rate, and staying time when the user interacts with the product. Through their representation of the behavior, the user portrait could help the user researcher understand the user's deep motivation and psychology. Thirdly, through the analysis of user portraits, researchers could understand the trends of the industry, such as the trend analysis of consumer preferences of the young, the brand analysis of high-value users, and analysis of consumption of different regional categories. The insights of these industries could guide the platform to better operate and grasped the general trend, and could also provide relevant companies with in-depth insights into the subdivisions.

2. Literature review

2.1 Previous research on user persona

User persona is a descriptive model derived from the user researches[2]. At the beginning, the persona process used to be embed into the design of the software and other kinds of product. There are a lot of methods for analyzing the user researches. Behavioral observation is one of the methods. It is uneasy to conduct approach that the researchers observe the interaction between the players and the games and then find some clues during user's facial expressions, social interaction and body language[3]. As for the previous research on user persona, Syskill & Webert[4] of University of California collected user's satisfaction degree on the current page through the display, and then gradually learned to establish the user's interest model. Web Watcher[5, 6] invented by Carnegie Mellon University is a data collector which is used to record various behavior patterns, various browsing behaviors and user preferences on the Internet. Meanwhile, the statistical information is used to statistically obtain the browsing behavior of the user groups to construct user's interest model. Besides, Carnegie Mellon University developed another system facing to the individual user which called Personal Web Watcher[7]. Based on the click stream data, the system established a model of user interest and system model would be updated as the data continuously accumulated.

2.2 The development of the mobile games in the world

According to the report of the magazine [8] in the United States, developed countries have entered the era of recreation and entertainment. The output value of the area of entertainment accounts for half of the GDP in the United States. Most of people's time and two-thirds of their income is spent on the entertainment. The world has entered a colorful "entertainment economy" era. According to Newzoo data [9], the global game market was expected to reach \$108.9 billion in 2017, an increase of 7.8% over the previous year. In terms of mobile games (including tablets and smart phones), the market size accounted for 42.0% of the overall game market and it occupied the largest proportion which is approximately \$45,738 million. In 2018, the global mobile game market will reach \$52.1 billion, and it will also be the gaming platform with the fastest game growth and largest market scale in all platforms.

2.3 The development of mobile games in China

2012 was the first year of the Chinese mobile game industry, with rapid growth from the now. Endgames and mobile games, as the two major branches of the game industry, have been fluctuated in the past few years. In 2015, the scale of China's mobile game market reached \$8.017 billion, and it is closely following the end-game market. However, by 2016, Dr.Eye expects that the size of China's mobile gaming market will fully exceed the end-game market, reaching \$10.27 billion, and will continue to maintain a growth rate of nearly 30.0% [10]. In 2015, with PC game companies participate in mobile games, the original amount of PC game products has been ported to mobile terminals, which has lengthened the average gaming time of mobile games. Research's survey data shows that only 18.0% of users report that their game time is less than half an hour, and 28.0% of players said that playing

mobile games costs longer. Mobile game market had an inflection point in 2016. It exceeded the PC games for the first time and became the largest market segment. In 2018, mobile games market occupied 60.0% due to the long commuting time and the fast pace of life of game player's [11].

Tencent Cloud Analytics [12], a mobile application statistical analysis tool, released a data report based on a sample survey of hand-related data from January to February of this year. It can conclude that among the mobile users who pay more on the games, the percentage ratio of male and female is 85.3%: 12.8%. Mobile games payers are mainly 25 to 30-year-old office workers. 70.0% of mobile game payers are aged from 25 to 50.

3. User persona

3.1 *The analysis of user persona*

There are several ways to analyze the user persona.

1. Quantitative classification of player groups. The player structure can be derived from the player data and it includes the player gender structure, the player age structure, the player income structure and the device structure used by the players (IOS/android, device brand, device hardware, etc.).
2. Players' preference and behavior analysis. The relationship between player structure and player preference & behavior is obtained from the player's data. From the positioning of the product, the target user is sought for the product. The difference between the relevant competing product is found. The advice can be provided to market segmentation and market positioning.
3. Core player portrait analysis. The first step is to extract data to understand the player's situation and some key indicators. After grasping some preliminary player's situation, we obtained the key indicators. After the data is cleaned, the players are grouped by cluster analysis. In the second step, qualitative interviews are conducted for each group or individual types of players to explore the players' life situations and experience scenes. Around the behavioral characteristics of various players, the players' core needs can be understood, the potential opportunities of various players can be found, the granularity can be refined, and a portrait of the core player can be formed.

3.2 *User persona on the area of games*

Revenue is the basic criterion for evaluating the success of a game. It is well-known that $\text{income} = \text{active player} * \text{ARPU}$. Naturally, it can be seen that there is a positive relationship between active players and income.

We can generally understand the basic situation of game users from the following aspects [13].

1. The basic information of user. Firstly, it is the model distribution. The type of mobile can explain the player's economic strength. In most cases, the more expensive of the mobile phones, the higher ability for the players to pay for the games is. Secondly, it is the gender distribution. Players' participation can be seen from the perspective of gender distribution, and the gender distribution can provide guiding suggestion for the promotion of the game. Thirdly, the distribution of cities can tell the geographical origins of the game's major groups, and they can carry out offline activities according to different cities. Besides, occupation distribution can act as a dimension of reference for willingness to pay.
2. User behavior classification. Firstly, it is active time. According to the player's active time distribution, a reasonable arrangement of game operation activities can be used to increase activity participation and increase profits. Secondly, it is the total time distribution. Thirdly, it is the distribution of payment users.
3. User source channel. Users in different markets still have a certain gap in the performance of the game including the enrollment time and the way to enroll.

As if we want to get the data from users to analyze user persona, we need to interview users and design the questionnaire. As for how to design the questionnaire, we would talk about the differences between the mobile games and PC games in the next section.

4. Discussion

4.1 Interaction in mobile games vs. PC games

Interaction in mobile games:

1. Simple method to operate. Because of the size limitation of the mobile phone screen, it is necessary to operate as simply as possible.

2. Operating tools. Mobile games are easy to operate. It only needs your finger to touch on the screen. Therefore, there is no need for preliminary preparation. To start a game is only to pull out the phone.

Interaction in PC games:

PC game is controlled by a gamepad, a mouse, and a keyboard. The operability is relatively strong, so the design can be relatively complicated.

4.2 Scenario of mobile games vs. PC games

Scenario of mobile games:

1. The screen is small. If the design scene is more complicated, it will cause the player to miss the information and be difficult to handle. Therefore, the design of mobile games should be as simple as possible.

2. Limited color and sound support. Although the color screen mobile phones occupied a large part of market, the color displayed on mobile phones is still far from the PC in terms of quality and quantity. As for sound effects, the main decisive factors are frequency response, bandwidth, chords and power. Thus, mobile phone's existing device playback is still not ideal.

3. When we need to answer or make a call, the online game may be interrupted. Thus, the game program must be able to pause and continue. This pause can neither cause the problem such as the player is still moving while accepting the call and leading to the player be killed and lose the game. And it cannot lead to memory overflow. These are problems that developers need to give due consideration at design time.

4. The storage of mobile is also a constraint. The limited mobile phone memory can meet the needs of most of today's ordinary games and other entertainment applications. But it is the biggest obstacle to the next generation of games. For example, a mobile phone can only have four games at a time. This means that the player's gaming experience is limited. They must make choices: either to keep their favorite games or to give up their former love when they want to try new games.

Scenario of PC games:

1. PC games suit better for people who stay at home or at the Internet bar. The game environment is more stable.

2. The playing time of PC games is always longer than mobile games. Thus, PC games need people to be more concentrated on the game.

3. Most Electric Sports are based on PC due to it seems formal.

4.3 The characteristics of mobile games vs. PC games

The characteristics of mobile games:

1. Mobile games are always easy to learn. Mobile games require great operability and ease of learning and often do not require much skill. While ensuring the degree of entertainment, it also need to ensure the simplicity of the game.

2. The game can be interrupted as we had mentioned before. The function of the mobile phone is not limited to games and it still has the communication function, the chat function, the resource sharing function, etc. These are also essential functions of the mobile phone. Mobile users often have other tasks to perform while playing games. Therefore, in addition to ensuring their entertainment, mobile games must ensure the disrupt ability so that mobile phones can switch between games and other functions freely.

3. Mobile games require rich SNS support. Without the social interaction, players will be easy to get bored with the mobile game. The advantage of interactive games is that players can enhance the randomness of the game from the multi-person interaction to maintain the player's interest. Even through mobile games are full of variety, online-based interactive games often achieve great success.

4. Mobile games depend on the development of mobile phone technology. Good mobile games need to seize the device function.

The characteristics of PC games:

The plot of the game is always fluctuated and fascinated due to the game time is longer. The system is more playable and complex. It is difference from the mobile games. If the games on PC are simple to play, players will feel boring and the game will not retain users. Besides, the picture can be more exquisite due to the size of the screen and the music atmosphere can be more attractive. The impact of the attack is strong. PC games will give the players auditory enjoyment.

5. Cognition analyze on mobile games

Not only the machine itself, but also the human perspective should be considered. We also need to consider the ability of people to receive information when we design the questionnaire.

The main organ of cognition is the nervous system. The nervous system is the material basis of psychological phenomena, and all human psychological and conscious activities are also achieved through the activities of the nervous system. Human cognition is divided into feeling and perception. Feeling is the reflection of the individual attributes of the human brain directly acting on the sensory organs. Feeling is the channel through which people understand the outside world and the basis and premise of all complex psychological activities.

Because human cognition has defects. Such as people are easy to forget, have limited attention resources that cannot be concentrated on tasks for a long time, instantaneous memory is constrained and like to solve encounter operational problems according to inherent experience and still the limitation of visual recognition capabilities.

We need to understand the user's perception characteristics and cognitive characteristics before the operation, during the operation, and after the operation to create a user persona. The basic contents include the following sections.

5.1 The five senses of people

The essence of cognitive psychology is the study to research the structure and process of cognitive activities. The core is to reveal the internal psychological mechanism of cognition, that is, how information is obtained, stored, processed and used. In the user perception characteristics, we must understand the five senses of people's sight, hearing, smell, taste, touch, etc. In the design, designers should consider providing multimedia information, fully mobilize a variety of sensory capabilities, and increase the identification of information.

5.2 Human ecological perception

According to Gibson's ecological perception theory, the observer's movement through the environment produces a continuously changing visual arrangement, which is also the center of his interpretation of form, size, distance, depth, and motion perception. In the same way, when the user is in a certain position of the game during operation, the information of each angle provided by the design may not be perceived, which may result in poor information transmission and waste of product functions. Therefore, designers need to understand the relative position of users and products, analyze which operations, rely on what perception system, and what information to meet the needs of users.

5.3 Human aesthetic perception

Aesthetic perception includes the user's comprehensive grasp of the shape, color, coordination and other elements of the product. When constructing the user model, the aesthetic appeal to the user

should also be considered. User aesthetic perception is influenced by various factors such as age, occupation, cultural accomplishment and trend of the times.

6. Conclusion

The study focuses on the user persona of mobile games. In the course of this analysis, we discuss the differences between mobile games and PC games in the scope of interaction, scenario and characteristics. Besides, we analyze the mobile games in the areas of cognition. Mobile games have the advantages that easier operation, interrupted and limited hardware devices and storage comparing with the PC games. In addition, mobile games are easier to begin and need more SNS support. Moreover, this research analyzes the cognition fields for the mobile games in the five sense of people, human ecological perception and human aesthetic perception. The study concludes that when we design the questionnaire of user persona for mobile games, we need consider not only the characteristics of mobile games, but also the field of cognitive psychology.

Additional research should focus on the designing of the questionnaire and establish a model to find the factors of the user persona.

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