

USER EXPERIENCE PROCESS OF ANDROID TEA-THEMED MOBILE ONLINE GAMES

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Abstract. The user experience of mobile online games has gradually become an important issue for designers and researchers. This paper measures the mobile online game performance of 50 Android Tea-themed mobile online games and the experience of advertising forms in mobile online games. Particularly, the game performance includes login steps, required time, whether the game process is saved, and the steps and time to exit the game. In-game advertising includes the form of advertising in the game and the time it takes. This study provides data references for designers and researchers for designing and developing different games.

Keywords: mobile online game, user experience, mobile in-game advertising.

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1 Introduction

According to the 49th “Statistical Report on Internet Development in China” released by the China Internet Network Information Center, the number of mobile Internet users in China reached 1.029 billion in December 2021, and the proportion of Internet users using online mobile phones to access the Internet was 99.7% (CINIC., 2022). At the same time, the number of mobile online game users in China reached 730 million, and the size of the Chinese mobile online game market reached 307.8 billion yuan, a year-on-year increase of 9.8%; the mobile online game industry has entered a stage of steady development, and playing mobile online games has become a popular form of entertainment (IRI., 2022). The gradual stabilization of 5G technology will further provide a faster game loading speed for mobile online games, and mobile online games will have more market shares (Open Signal., 2020).

Mobile online games are video games usually played on a smartphone with the Internet environment (Jin, 2016). Mobile online games include the methods of mass communication and interpersonal communication; from the perspective of the former, it can be used as a medium of cultural communication (Bao et al., 2019). At the same time, mobile online games also have the characteristics of flexibility, universality, localization, entertainment, fun, personalization, and mobility (Shankar & Balasubramanian, 2019). Being entertaining and fun are powerful characteristics of mobile online games, which enhance users’ acceptance and understanding of traditional culture; using games as a carrier for spreading culture can make it easier for traditional culture to enter people’s fast-paced life (Wang, 2018).

With the increasing number of mobile online game users, mobile in-game advertising has become increasingly important for one, mobile in-game advertising can deliver relevant advertisements to users based on their geographic location and behavior, resulting in higher conversion

rates and better user experience; for another, the increase of free mobile games has brought a huge user base, and monetizing advertising has become an important channel for game developers to make profits (Wen, 2016). On the basis of research data from mobile online gaming industry statistics and trends for 2021, 82% of mobile online gamers prefer free mobile online games with advertisements to paid mobile online games without advertisements (SocialPeta., 2021). Judging from the proportion of game behaviors that game users have had in 2020, about 80% of game users have seen in-game advertisements, and watching in-game advertisements has become a more common and highly accepted business model (Zhiyan, 2021). At the same time, according to consumers' perception, video advertising that lasts for more than 15 seconds is irritating and is deemed too long, whereas those that last for 15 seconds or less are more acceptable and less irritable (Raditya et al , 2020). Moreover, excessive amount of advertisement push will interrupt the users' game operation, and the experience will be disagreeable (Game Analytics, 2017).

This study is a part of an ongoing research project that uses mobile online games as a carrier to spread Chinese tea culture. Therefore, this study takes tea-themed mobile online games as an example to measure the user experience process of 50 tea-themed mobile online games on the Android system, as well as the forms of interstitial advertisements in the games and their corresponding times. Scholars have discovered that response time greatly affects user experience, because a longer response time may reduce user satisfaction (Egger et al, 2012). The limit for keeping users' attention focused on the dialog is about 10 seconds; when users wait for an unreasonably long period, users are more inclined to forsake and switch to faster alternatives (Nah, 2004). Therefore, during the mobile online game experience process, a shorter response time will bring a better experience to users. Designers should consider this factor when designing mobile online games.

2 Research Methodology

2.1 Research Samples

Sample Population: The sampling scope of this study is the Google Play application market. The sampling method, which is the total number of samples, is 55 tea game applications that appear by entering the "tea game" as a keyword in Google Play.

Sampling Principle: Any one of the following items does not meet the sampling principle:

- a)* Not related to the game
- b)* Compulsory consumption
- c)* Forced access to mobile phone permissions
- d)* The system is updating and cannot be used.

Sample Size: The sample size obtained after screening through the above sampling principle is the 50 game applications, as shown in Figure 1.

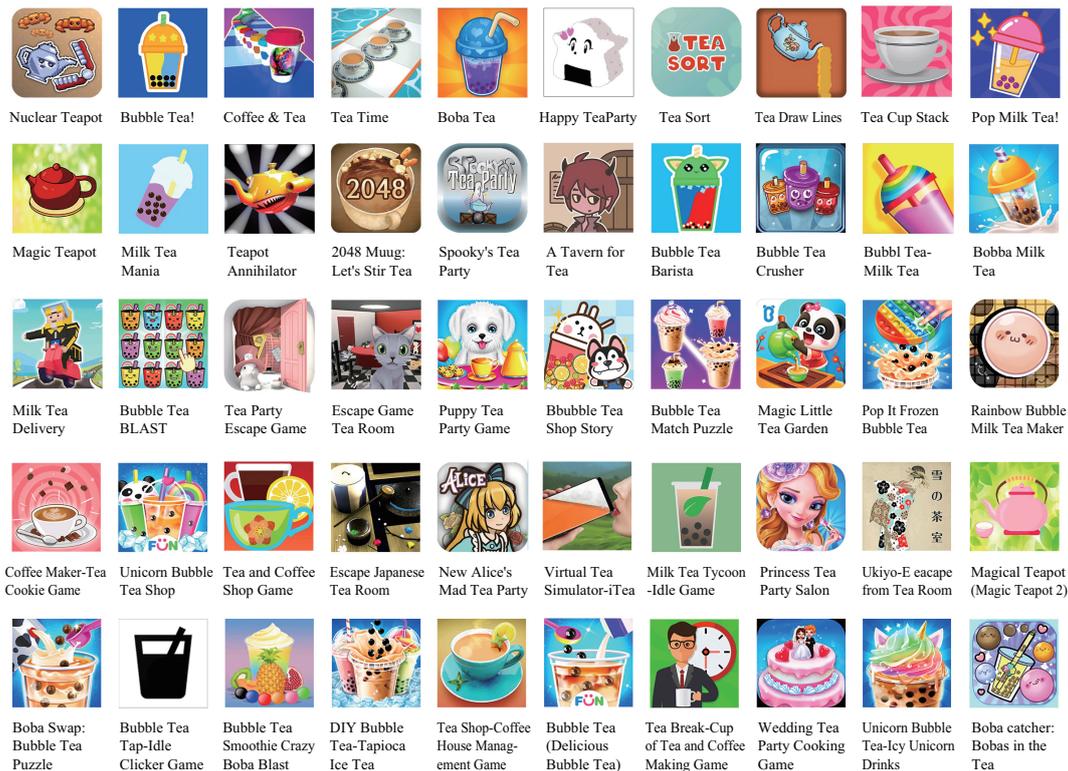


Figure 1: 50 Samples download from Google Play

2.2 Hardware

This research uses the Huawei P30 Pro VOG-AL10 model HarmonyOS version 2.0.0 system with the following specifications: Processor: Huawei Kirin 980; running memory: 8.0 GB; storage: 512 GB. The test is timed using the stopwatch tool in Apple mobile phone, and the environment is 4G network.

2.3 Measured Experience Process

According to Jakob Nielsen's 10 usability heuristics for user interface design, Point 1 is the visibility of system status: The design should always keep users informed about what is going on through appropriate feedback within a reasonable amount of time. Point 3 is user control and freedom: Ease of backing out of a process or undoing an action fosters a sense of freedom and confidence. Exits allow users to remain in control of the system and avoid getting stuck and feeling frustrated (Nielsen, 2020). This study puts the user experience performance test content of mobile games to assess the difficulty of the steps to log in to the game, the required time, whether the game process is saved, and the difficulty and time of the steps to exit the game. The scope of advertisements in the game are measured as the display form of the advertisement, the playing time, whether closing the advertisement is easy, and how long it takes to close the advertisement.

On the basis of the performance of the mobile online game experience mentioned above and the advertising forms in the mobile online game, we measure the performance of mobile games and the form and duration of in-game advertisements.

2.3.1 Performance of Mobile Games

- a) Steps required to login to the game interface

- b) Time required to enter the game
- c) Function to save the game progress
- d) Steps and methods of saving the game progress
- e) Steps and difficulty levels to exit the game
- f) Amount of time it takes to quit the game.

2.3.2 Form and Duration of In-game Advertisements

- a) Form of push advertising in the game
- b) Frequency of advertisement push
- c) Push the duration of a single advertisement

3 Result

On the basis of the measurement tools, as well as the mobile online game performance measurement range and the in-game advertisement form measurement range mentioned above, the game experience process of 50 samples was measured. The related data were sorted to obtain the following data results.

3.1 Performance of Mobile Online Games

The steps to log in to the game have three forms, namely, one-, two-, and three-step, which account for 32%, 48%, and 20%, respectively, with the two-step being the highest. As shown in Figure 2, the loading speed of the three-step login process takes more time, and 7 out of 10 games take more than 10 seconds to log in. The longer the login time required is, the worse the user experience will be.

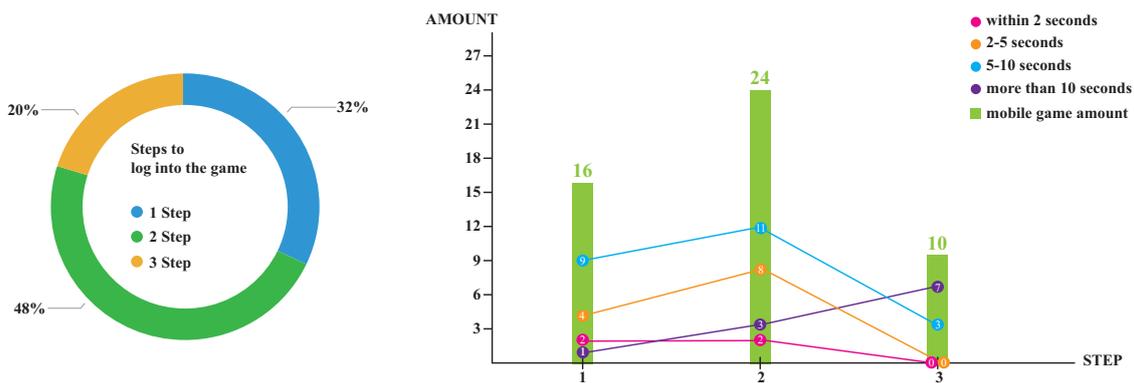


Figure 2: Login steps proportion pie chart and login steps with loading time bar chart

According to the measurement of 50 game samples, 36 games have the function of saving the game progress, accounting for 72% of the total. Particularly, 33 games can save real-time data after exiting the mobile game application. Two games can only save photos when passing each level, but the game progress cannot be saved in real-time. One game needs to complete a level to save the progress; if the game level is not completed, then the game progress cannot be saved. Moreover, 14 games do not save the game progress, accounting for 28% of the total. These details are shown in Figure 3.

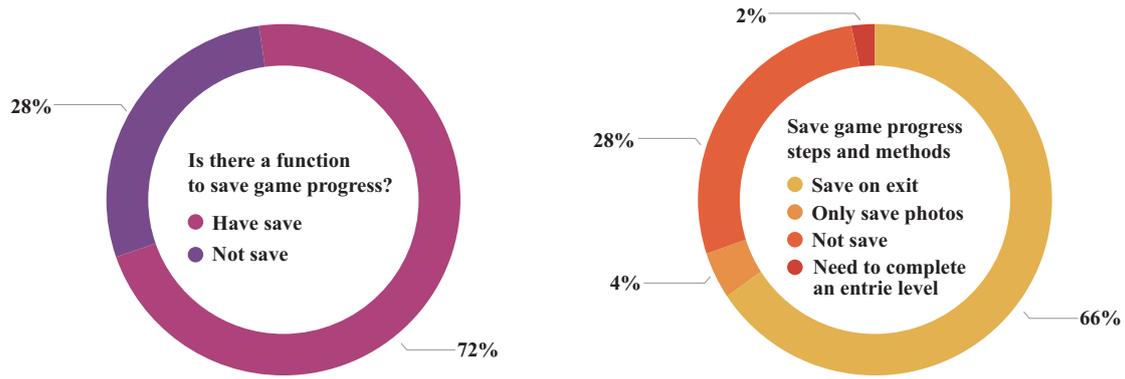


Figure 3: Login steps proportion pie chart and login steps with loading time bar chart

The measurement results show that most mobile games choose the one-step and simple exit methods. Among the 50 samples, in 45 games, the game application can be closed by taking one step and only 1 second by one sliding action. Few games choose the multistep or the difficult method of exiting the game. As shown in Table 1, only three games choose the multistep, and two choose the difficult exit method.

Table 1: Steps, Difficulty, and Time Consumption

Step	Amount	Difficulty	Time Consuming (second)
1-step, swipe up the screen to exit the program	45	easy	1
2-step, swipe up twice, and then find the running program and close it	3	relatively easy	2
Multiple steps, multiple ways	2	hard	6

3.2 Form and Duration of In-game Advertisements

Among the games, 16 do not have advertisements in the game experience process, accounting for 32%; 27 have various advertising forms, accounting for 54%; and 7 games only have one form of advertisement, accounting for 14%. The proportion of mobile games containing advertisements is high at 68%. In the game measurement process, the frequency of advertisement push is also a concern of this study. Among the 50 game samples, 44% do not push advertisements, 12% have low-frequency pop-ups, 6% have medium-frequency pop-ups, and 38% have high-frequency pop-ups. The test results show that although the proportion of advertisements in mobile games is extremely large, as high as 68%, the high-frequency push method accounts for a relatively small proportion, accounting only for 38% of the total number of advertisements, as shown in Figure 4.

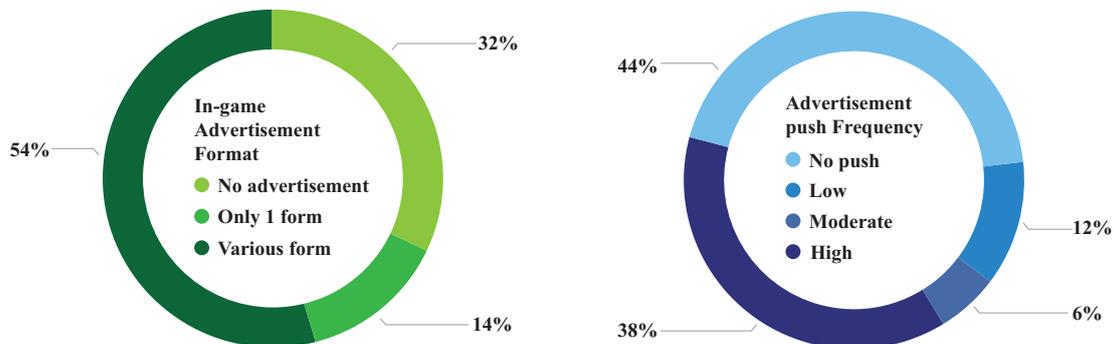


Figure 4: Login steps proportion pie chart and login steps with loading time bar chart

Among the 50 game samples measured, 34 games contain advertisements, and the forms of

advertisements are mainly divided into three categories: banner, native, and rewarded advertisements. Although the specific presentation content of the banner and native advertisements is different, the duration of the advertisement is within 5–15 seconds, and most can be closed after 5 seconds, which is short. Reward-type advertisements are longer, ranging from 20 to 45 seconds (Table 2).

Table 2. Types of Advertisement Pushes and Their Corresponding Times

<i>Form of advertising</i>	<i>The display content of the advertisements in the research sample</i>	<i>Amount</i>	<i>Time Length (second)</i>
Banner advertisement	There always exists an advertisement floating window at the bottom of the screen	27	5-15
Native advertisement	When entering the game, a static advertisement will pop up, which can be closed at any time	12	5
	Play three innings to force a pop-up static advertisement, which can be closed at any time	3	5
	Force a pop-up advertisement every time a mission fails or every level; it will close after 5 seconds	5	15
	Randomly force pop-up ads when playing games	5	5
Rewarded advertisement	Requires opt-in to watch a video advertisement to play games for free	1	5
	Watch advertisement to win game coins	9	20-30
	When you need to pass the level props during the game, an advertisement will pop up	3	25-45

4 Summary

The sampling test indicates that the login steps and speed of game performance, the preservation and method of game progress, the steps to exit the game, the degree of difficulty, and the time are all related to one another. In addition, the forms of advertisements in the game are coordinated with their corresponding display times. The design can be adjusted according to different needs. This study provides game designers, developers, and academic researchers the results of testing content during the game experience as a reference guide when designing different mobile games.

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