



Research on Interactive Interface Design of Mobile Games

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Abstract. With the development of technology and technological updates, mobile phones have become more and more powerful, which has provided a strong guarantee for the flourishing of mobile games. The convenience and social nature of mobile gaming have led to more and more people getting into it, making it one of the choices in people's daily entertainment lives. The application of new media technology to mobile games has led to an increasingly user-friendly design that is more attuned to the interests and habits of users, and one of the most popular areas of research is the design of the human-computer interaction interface. As an important medium for human interaction with games, the interface has a deep impact on the quality of the game, and a good interface design will largely enhance the user experience and increase the attractiveness of the product, thus effectively promoting user growth. Therefore, this paper will elaborate on the topic of HMI design in mobile games, discussing the relationship between mobile games and art design, exploring the design strategies, and discussing and analyzing some design elements from the perspective of user use. The design of a mobile game interface is based on the principles of consistency between art style and theme, simplicity and ease of use, unity and harmony of design style, and user-oriented design, which provide theoretical reference for future mobile game interface design.

Keywords: Mobile Games · Interactive Interfaces · Human-computer Interaction · Design Principles

1 Introduction

At this stage, technology is developing at a rapid pace, and mobile phones are becoming more and more powerful, providing strong hardware support for the development and prosperity of mobile games, and making it possible for mobile games to enter the entertainment lives of the public [1]. Mobile phone games are essentially a kind of mobile phone software that uses the mobile phone as the running carrier, with strong virtual and entertainment elements. Compared to traditional PC and console games, mobile games are very convenient to use. People can open their mobile phones anytime and anywhere to play, which in today's fast-paced life, can be a good way to spend fragmented time. In addition to this, many types of mobile games have now become part of people's social lives, allowing them to team up with good friends or even people they don't know very well to play and bond with each other. These features have given mobile games a unique

advantage and have led to their rapid development in recent years. However, the interface design of mobile games has become more difficult due to the limitations of the mode of operation, technical conditions, and other factors. For example, as mobile games run on mobile devices, players need to rely on a small touch screen to operate them, which requires interface designers to lay out the game's buttons in a way that fits the user's operating habits while avoiding mis-touching as much as possible to avoid giving the user a bad experience. As an important medium of communication between users and the game, the interactive interface is a product of a high degree of integration between science and art. An excellent interactive interface design not only facilitates the user's operation, but also effectively enhances the user's experience and immersion when playing the game, thus potentially promoting user growth and improving user stickiness [2]. Therefore, this paper will discuss and analyze some principles and strategies of mobile game interactive interface design, clarify the characteristics of a good interface design, and provide a theoretical reference for designing a human-computer interaction interface that meets the diverse entertainment needs of users.

2 Introduction to Relative Theories

2.1 Human-Computer Interaction

Human-computer interaction technology refers to the technology that enables human-computer dialogue in an effective way through the input and output devices of a computer. As a discipline that studies the exchange of information between humans and computers, it is closely related to a number of disciplines such as cognitive psychology, ergonomics, and multimedia technology, and covers theories and methods such as modelling, design and evaluation, as well as applied research in Web, mobile computing, and virtual reality [3]. The process of human-computer interaction has evolved from the user adapting to the computer to the computer continuously adapting to the user, and the input and output information has changed from precise data to non-precise input and output information, achieving a natural and harmonious human-computer interaction from the command line to graphical user interface interaction and finally. For the human-computer interaction design of mobile devices discussed in this paper, human-computer interaction refers to the process in which the user inputs information to the phone through the interface and the phone provides feedback to the user through the screen and sound.

2.2 Interaction Design

Interaction design is a comprehensive discipline, first introduced in 1984 by Bill Moggridge, the founder of IDEO, who developed a similar concept and gradually named the design approach 'interaction design' as the discipline evolved [4]. The essence of interaction design is to make machines work for people, to make people transcend machines, and to make people interact and communicate with each other through product communication and service. Interaction design is now understood in general terms as a medium of communication between humans and machines, enabling them to better understand each other and provide users with a better experience of using intelligent products.

Initially, interaction design was designed from the designer's point of view, designing the interface and functionality. However, as science progresses, the focus of interaction design has gradually shifted from the designer to the user, and in the future, this trend will increase, with interaction design moving closer to the user's needs and enabling smart products to better serve the user [5].

Interaction design is an essential part of mobile games. The interface is the medium through which people communicate with machines, and mobile games are essentially about people communicating with each other through the interface [6]. A good interaction design will help the player to better understand the rules of the game, efficiently output information to the player, and guide the player take the next step. In the following analysis and discussion, this paper will explore these design principles and strategies in detail, summarize their core principles, and explain how they can be implemented.

3 Analysis of Interface Design Principles

3.1 The Principle of Consistency Between Art Style and Theme

A mobile game's interface should be consistent with the game's worldview, with the overall color scheme and layout of the interface being designed around the theme. As part of the game, the interactive interface also affects the user's immersion, if the interface design is always consistent with the theme, from fonts, colors, overall structure and other aspects of the game's theme, then the user will be able to more easily enter the "mind flow" state, immersed in the virtual environment created by the game [7]. This will effectively enhance the user experience. On the contrary, if the design of the interface is not in line with the theme of the game or is even very different, the user will easily feel a strong sense of dissonance during play and will not be able to maintain a high level of concentration. Therefore, when selecting and designing interface elements, careful consideration must be given to making sure that they serve the theme of the game. For example, if the game is a casual puzzle game, such as "Fun" or "Parkour", you can use cute elements, such as rounded rectangles, and bright colors. However, if the theme of the game is a wasteland, then these playful and cute elements will look a bit out of place and largely affect the user's experience, making it difficult for the user to immerse themselves in the virtual world of the game. One of the better interface designs is *Infinity Blade*. As an action game, its main focus is on collecting cold weapons and armor to strengthen oneself and constantly fighting against more powerful enemies. Due to the seriousness of the setting, the tone is realistic and combat-oriented, so the interface design is simple, with black and white as the main colors and a relatively low saturation of patterns to create a solemn atmosphere. In contrast, as a casual puzzle game, the interface design of *Subway Runner* is much cuter and more playful, using rounded rectangles and bubble fonts to make the whole interface look more vivid, and also using more saturated yellow and red colors to attract players' attention. Although the interface design of these games is very different, they all fit the theme of the game well and help users immerse themselves in the game itself, so they are all appropriate and excellent interface designs.

3.2 The Principle of Simplicity and Ease of Use

Since the medium of interaction in mobile games is a small touch screen, it is a challenge to present enough information to the user. The interface can be designed to be more complex, with large paragraphs of detailed text for difficult-to-understand content, and options can be placed more freely. However, unlike mobile games, due to the limitations of the display device, the interactive interface of a game is very limited in the amount of content that can be presented to the user at the same time, and this, coupled with the limitations of the human visual field, makes the design of this interactive interface very crowded if too much graphic or textual content is presented on a single interface at the same time, and causes great visual pressure on the user, or in more serious cases, may cause the user to make frequent mis-touching due to the small size of the options. This can lead to frequent mis-touching and annoyance due to the small size of the options. To avoid this, the interface design of mobile games should be designed from the user's psychological point of view to ensure that the interface is as clean and tidy as possible, to reduce the user's visual screening pressure, and to reduce the occurrence of mis-touching, thus improving the user's experience [8].

To achieve this, we can do so in three ways.

1). A combination of text and pattern. Graphics, as a very visual element, can represent a certain function of use very well. Compared to reading text, using figurative icons to allow the user to understand the function of an option can undoubtedly greatly reduce the visual pressure on the user, making it easier for the user to play the game. Therefore, an interface presentation that uses patterns with a small amount of text is certainly more acceptable than simply piling up text. A good example of this is the 'Settings' option, an essential feature in almost all games, which is often represented by a small cogwheel that, when seen, tells the user to personalize the game by clicking on it.

2). Use different colors to distinguish between options. People are sensitive to contrasting colors, which means that if we can use different colors to convey information, we can save a lot of text and help the user find the option he needs to click on as quickly as possible. For example, when there is an unread email in the game, you can highlight the icon, replace the original icon color with a more saturated color, or mark the top right corner of the icon with a yellow dot to indicate that you have unread emails, rather than using text, which can cause visual stress. The message will be displayed in the right-hand corner of the icon with a yellow dot. In addition to this, marking options that have serious consequences with a special color can also alert the user so that they do not accidentally touch them. For example, a prominent red 'exit' button can be a timely reminder that you are performing a 'dangerous' action, making users more careful when doing so, thus reducing the number of accidental touches and improving the user experience.

3). Use shrink bars. As previously mentioned, placing too many options within the same interface can easily cause visual filtering pressure on the user, resulting in a poor experience. However, sometimes games have to have enough options to ensure that the player gets the full gameplay experience. This is where we can use shrink bars to hide some of the less frequently used features or options that are used more frequently to avoid visual pressure on the user, and leave more space for options that the user may click on frequently, improving the space utilization of the interface. For example, the daily check-in option is very special, and although users need to click it every day, they

will not use it again after clicking it once a day. As a result, the daily check-in option would be somewhat redundant if placed on the main screen. This is where a shrink bar can be used to hide it after the user has completed the check-in and provide a place for more important features.

3.3 Principle of Unity and Harmony of Design Style

For the same game, it is important to respect the user's habits to make interaction with the game more comfortable, so it is important that the interaction options are laid out appropriately and in a consistent style from the user's point of view [9]. For example, if the game's main interface is lime green, it is usually appropriate that the other main interfaces that provide interaction should also be lime green, rather than changing the style. The same is, of course, true of the options design, where the font and border design should be consistent. If the design of the interface is changed too often in a game, it will not only destroy the unity of the game and make it look fragmented, but more importantly, it will go against the user's habits, and they will need to push themselves to adapt to the new style of operation and artwork, which will lead to fatigue.

In addition, the use of colors in the game should also have a harmonious nature. The color scheme of the game interface should be simple and clear, focusing on the mutual matching of colors to create a harmonious atmosphere of beauty [10]. If we pursue the colorfulness and magnificence of the screen, it will only accelerate the visual fatigue of the users and make them feel tired. Therefore, in the choice of colors for the interface design, we should try to use less saturated colors to avoid stimulating the user's vision, and use colors that are less likely to cause visual fatigue, such as yellow and cyan, to ensure that the user can have more energy to focus on the content of the game.

3.4 User-Oriented Design Principles

In addition to the three principles mentioned above, which almost all mobile games should follow, different games should also have personalized interface designs for different target user groups to improve the user experience and increase user stickiness. Different games usually have different groups of players, and players have different demands on the interface design of different games, so it is important to uphold the user-centric principle in the process of interactive interface design, and to make a diversified interface design based on the user's needs, in order to optimize the user's experience and truly win the user's approval. For example, for the highly competitive game "Glory of Kings", which requires players to cooperate with each other, an interface design for mutual communication between teammates is essential. In this game, the interactive interface has been designed with one-click shouting and one-click text-to-voice options to help players communicate effectively and enjoy the game better. This design adds to the fun of the game while allowing players to relax and keep in touch with their friends at the same time, so from a spiritual point of view, this design will be favored by more users. However, while recognizing the rationality of this design, we should also be aware that not all games require the option to communicate with your teammates in the interactive interface; it is only because competitive games require effective and active communication between teammates that we have designed this option from a user

needs perspective. If the game is about character or pet development, then the player base should be more casual and focused on communicating with their virtual characters, so an interface with the ability to communicate with teammates would be out of place. In this case, we should also personalize the interface from the point of view of user needs. For example, because the game is a nurturing game, it is easy for players to put their emotions into the characters in the game, or even into the characters themselves. If we can include options for interaction between the user and the virtual character in the interface design, such as clicking on the character in the interface to trigger a special voice or action, such a design can better meet the emotional needs of this type of user group, thus increasing user stickiness and promoting user growth.

4 Conclusion

As mentioned above, mobile gaming is now an almost essential part of people's daily entertainment life and has a very promising future due to its ease of use and social nature. However, it can also be seen that mobile games are more difficult to design interactive interfaces than PC and console games due to the smaller display size of cell phones. The design of a game's interface has a direct impact on the user's enjoyment of the game, and it is important to incorporate aesthetic elements and design concepts into the interaction design of the mobile phone interface. If the right interface design rules are not followed, if the use of colors, images and text are not carefully considered, and if the interface design is not optimized from the user's point of view, it can easily lead to user resistance and inhibit the growth of user numbers. Therefore, in order to better enhance the entertainment and science of mobile game interactive interface design, this paper proposes the principles of art style and theme consistency, simplicity and ease of use, unity and harmony of design style, and user-oriented design principles, aiming to ensure that the interactive interface is fully functional while making the interface design more relevant to the potential needs of users, enriching the user's game experience, and according to the target user groups. The aim is to ensure that the interactive interface is fully functional, while at the same time making the interface design more relevant to the potential needs of the user, enriching the user's gaming experience, and diversifying the interactive interface design to maintain better user growth according to the target user groups. In the future, mobile game interaction interface design research will generate new challenges as technology continues to develop. Only by constantly adapting the interface design to the needs of users can we ensure that the user experience becomes better and better, thus promoting the healthy development of mobile games and other related industries.

This paper combines the strengths and weaknesses of previous game interface designs, and summarizes the principles of consistency between art style and theme, simplicity and ease of use, unity and harmony of design style, and user-oriented design principles, providing theoretical guidance for mobile game interactive interface design, but these theoretical principles have not yet been truly applied to the design of a practical mobile game interactive interface. The theoretical principles have not yet been applied to the design and development of an actual mobile game interface. In the future, I will apply these principles to the design of a game to create a better gaming experience for the user and to further demonstrate the feasibility and practicality of these design principles.

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