

Research on the Interface Design of Elderly Care APP Based on the Elderly Group: Take the Pension APP “Xiyang” as an Example

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Abstract: With the cross integration of the digital intelligence era and the aging society, smart products are becoming increasingly popular in both the household and social sectors. The traditional home care and community care can no longer meet the modern, diversified and personalized needs of the elderly, and “Internet + pension” has also become a hot topic. As an innovative pension service model, pension APP is gradually becoming an important tool to improve the quality of life of the elderly. As an important part of the pension APP, the interface design directly affects the user’s experience and satisfaction. This paper uses questionnaire surveys, interviews and other methods to understand the living conditions and predicaments of the elderly in the era of intelligence. Through statistics and analysis of the survey results and combined with the characteristics of this specialty, this paper discusses how the interface design of Xiyang APP should meet the special needs of the elderly and provide a more comfortable and convenient user experience for the elderly.

Keywords: Needs of the Elderly; User Experience; User-centered Design; Age-appropriate; Interface Design

1. Introduction

1.1 Background and Significance

With the rapid development of science and technology and the intensification of the aging trend of the population, the demand for elderly care services is increasing. According to China’s National Bureau of Statistics, by the end of 2023, China’s elderly population aged 60 and above has exceeded 250 million, accounting for 18% of the total population, and by 2050, the global elderly population aged 60 and above is expected to reach 2.2 billion,

accounting for 22% of the total population. As the country with the largest elderly population in the world, China’s aging problem is particularly severe. This demographic change has had a profound impact on many areas of social economy, healthcare, family relationships, and social services.

In order to meet this challenge, the pension APP has emerged as a new model that combines modern information technology and pension services. The pension app uses the Internet of Things, cloud computing, big data, artificial intelligence and other technologies to provide more convenient and personalized pension services for the elderly through smart devices and applications. As an important part of the pension APP, interface design directly affects the user’s experience and service quality.

The survey found that the interface design of most APPs on the market is mainly aimed at young people, and the elderly will encounter problems such as complex operation, unclear information display, and lack of targeted services when using APP, which affects the experience of the elderly. In view of this phenomenon, this paper takes the “Xiyang” APP as an example, and fully considers the difficulties encountered by the elderly when using the APP when designing the interface of the Xiyang APP, and designs an interface that is more in line with the habits and needs of the elderly[1].

1.2 Research Status at Home and Abroad

With the intensification of the aging trend of the population and the rapid progress of science and technology, this field is gradually receiving extensive attention.

(1) The current status of domestic research

In China, the interface design of the pension APP takes the user experience as the core, fully considers the cognitive characteristics

and operating habits of the elderly, and pays attention to the problems of simple interface layout, harmonious color matching, and moderate font size to ensure that the elderly can use it easily. Taking the Shunde Smart Pension APP as an example, the interface design of the APP adopts a concise orange and white theme, which makes the overall visual effect clear and clear, and users can quickly locate the required functions or information. The design of the navigation buttons and tabs makes the functional classification very clear, which improves the user's efficiency. In each tab and functional area, a combination of icons and text is used to enhance the visual effect and help users understand the purpose of the function more intuitively.

However, an overly concise design may lead to some important information or functions being hidden or ignored, and users need to spend more time exploring, and for some functions or services that are not commonly used, users may need to find them through multi-level navigation, which increases the difficulty of use. In some information or service pages, the text density is high, which may affect the user's reading experience. By analyzing the characteristics of Shunde smart pension APP, we should always pay attention to the user experience when designing the interface of the Xiyang APP, ensure that the interface should be concise and clear, easy to operate, and meet the needs and habits of different users at the same time. The most important thing is to collect user feedback on a regular basis, and continuously optimize and update the interface design according to user needs and feedback, so as to ensure that the interface is always in the best state [2].

(2) The current status of foreign research

In foreign countries, the interface design of pension APP is developing in the direction of being more humane, personalized and easy to use for the elderly. In terms of interface design, we pay attention to user experience, take into account the specific needs of the elderly, tend to simplify, and provide a more intuitive and easy-to-understand user interface. Take "PAPA" as an example, PAPA is an innovative home care platform founded in the United States, with a simple and clear interface design, and elderly users can quickly understand and use various functions. Provide a personalized service experience to meet the

needs of different users. The calendar view shows the date and time points, allowing users to visually view and schedule visits. This intuitive design showcases the types of services offered, so users can quickly understand what help is available to them.

However, from the perspective of cultural differences and functional depth, PAPA is a product for the American market, and its interface design and text may not fully conform to the usage habits and cultural background of the elderly in China. The most important thing is that we must take corresponding measures to improve and optimize it in combination with China's national conditions and actual conditions, and design a pension interface that is in line with the value orientation of the elderly in China (e.g., **Figure 1. Diagram of the PAPA Platform in the United States**) [3].

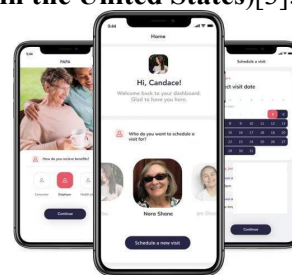


Figure 1. Diagram of the PAPA Platform in the United States

2. Related Theories

2.1 The Development Status of Pension Technology

The application of technologies such as the Internet of Things, big data, cloud computing, and artificial intelligence continues to promote the upgrading of pension services. The development of these technologies provides strong technical support for the design of pension apps, enabling them to achieve more diversified and personalized service functions. The Internet of Things (IoT) technology enables all kinds of smart devices to be interconnected to provide a full range of monitoring and care for the elderly [4]. Through smart wearable devices, the elderly can monitor their health status in real time and detect potential health problems in time. Big data technology can analyze the health data and living habits of the elderly to provide a basis for personalized services. Cloud computing technology provides powerful data

storage and processing capabilities for the pension APP, enabling the APP to handle a large number of user data and service requests to ensure the stability and reliability of the service. The application of artificial intelligence technology enables the pension APP to achieve a higher level of intelligent services. Through natural language processing, image recognition and other technologies, the APP can understand the voice and image information of the elderly, and provide intelligent Q&A, intelligent recommendation and other services. Through technologies such as machine learning, apps can continuously optimize their algorithms and models to improve the accuracy and efficiency of their services[5].

In view of the development status of pension technology, when designing the interface of the Xiyang APP, it is necessary to try to design these functions into visual icons, such as the “photo search” function and the “camera” icon, the “voice search” function and the “microphone” icon, the “real-time positioning” function and the “GPS map” icon, and design the health monitoring interface, life service interface, etc., so that the elderly can quickly identify the corresponding functions.

2.2 Physiological and Psychological Characteristics and Behavioral Habits of the Elderly

In terms of physiological characteristics, with the increase of age, the physical function of the elderly gradually declines, which is manifested by problems such as weakened muscle strength, reduced joint flexibility, and decreased vision. Specifically, the structure and function of their perceptual systems deteriorate, and visual and auditory impairments gradually appear, which affect their reception of information. In terms of psychological characteristics, some elderly people may feel negative and pessimistic about life, do not like to communicate with others, do not like to go out to socialize, due to the reduction of the supply of nutrients in the body, it may lead to abnormal hormone secretion in the body, and the internal fire breeds vigorously, so that the temper of some elderly people changes abnormally. In terms of behavioral habits, some older adults may have poor eating habits, such as indiscriminate eating and overeating, which may lead to decreased digestive system function and

increase the risk of hypertension, hyperlipidemia, diabetes, and other diseases [6].

In view of this physiological characteristics, psychological characteristics, and behavioral habits, larger fonts and icons should be used to facilitate the reading of the elderly when designing the interface of the Xiyang APP. Choose colors with high contrast to further enhance readability. The layout of the interface should be clear, such as placing key functions such as “quick consultation” and “finding a doctor” in a conspicuous position to reduce the difficulty of finding functions for the elderly. The picture design should be warm and use cordial greetings to increase the fun and sense of belonging of the elderly. Intuitive icons and prompts guide the operation, reducing the fear of new technology among the elderly[7].

3. Xiyang APP Demand Analysis and Interface Design Guidelines

3.1 Functional Requirements Research

In July 2022, Zhang Nan, a student majoring in digital media technology at the School of Computer and Information Engineering of Hubei Normal University, organized an eight-person “Silver Love Practice Team” to investigate the living conditions and difficulties of middle-aged and elderly people in the intelligent era in Hubei and Shanxi, laying a good foundation for the interface design of the Xiyang APP.

(1) The purpose of the research

Clarify the main functional needs of the elderly night care APP, understand the expectations of the elderly on APP interface design and operation process, find out the problems and difficulties that may exist in the process of using APP for the elderly, and provide data support and suggestions for APP interface design, optimization and marketing.

(2) Research methods

1) Questionnaire survey: Design a questionnaire with multiple choice, single choice, open question and answer and other question types, and distribute them to the elderly through online and offline channels to collect their functional needs and expectations for the Xiyang APP interface.

2) Interviews: Selected representative elderly people for in-depth interviews to understand their detailed needs, usage habits and problems

encountered in the Xiyang APP interface.

(3) Research content

Basic information such as age, gender, living status, and health status of the elderly were collected in order to classify and analyze the survey results. Investigate the specific functional needs of the elderly for the Xiyang APP, such as health management, life care, social entertainment, etc., and understand their expectations and requirements for the Xiyang APP interface.

(4) Survey results

The “Silver Love Practice Team” completed the research activities in August 2022, sorted out and analyzed the collected research data, found out the functional points and potential problems that the elderly are most concerned about, and combined with the characteristics of the major, provided data support for the interface design of the Xiyang APP. Some of the findings are as follows:

1) Degree of difficulty: According to the survey results, 62.94% of the elderly often encounter difficulties in the use of smart products, 35.53% of the elderly occasionally encounter difficulties, and 1.54% of the elderly do not encounter difficulties (e.g., **Figure 2. Pie Chart of Difficulty Level**).

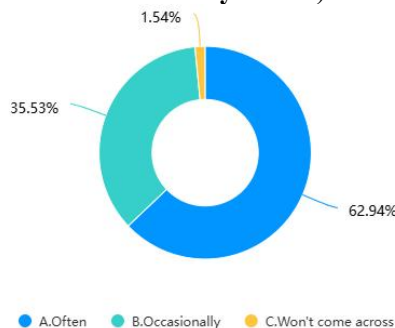


Figure 2. Pie Chart of Difficulty Level

2) Medical treatment: According to the survey results, 48% of the elderly tend to let their children help register, 34% of the elderly choose to take the manual channel to help register, 10% of the elderly will use mobile phones to make an appointment in advance, and 5.4% of the elderly will use self-service machines to register (e.g., **Figure 3. Pie Chart of Medical Care**).

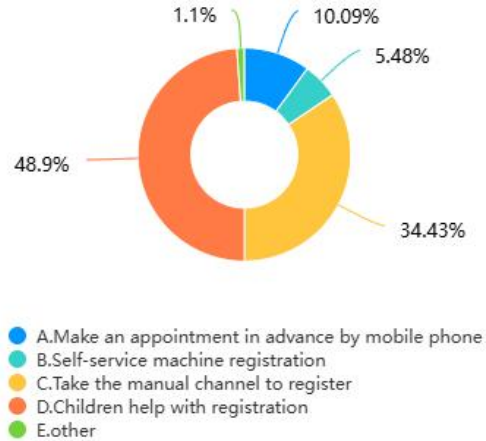


Figure 3. Pie Chart of Medical Care

3) Pension situation: According to the survey results, 46.4% of the elderly live with their spouses, 40.13% live with their children, 13.38% live alone, and fewer elderly people live in nursing homes (e.g., **Figure 4. Pie Chart of Pension Situation**).

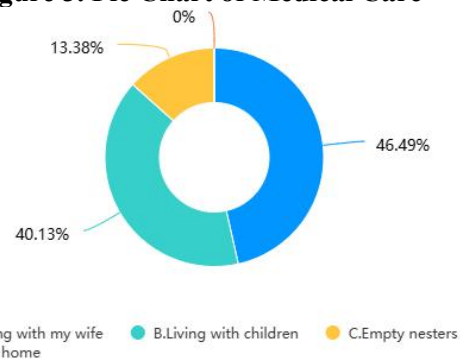


Figure 4. Pie Chart of Pension Situation

4) Difficulty type: According to the survey results, 70.18% of the elderly have inadvertently downloaded unknown software, 69.3% of the elderly have the situation that they can't remember the password and can't use the verification code, 61.84% of the elderly have difficulty in logging in and registration, 57.68% of the elderly can't adjust the mobile phone volume, font size, screen brightness, network connection, input method status, etc., and 43.42% of the elderly can't use the default gestures of the Internet. Figure 4 shows the pension situation and the type of hardship (e.g., **Figure 5. Pie Chart of Difficult Types**).

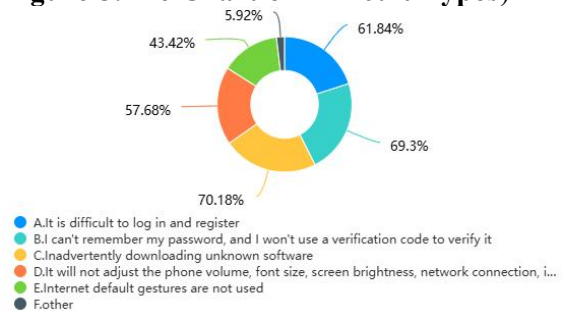


Figure 5. Pie Chart of Difficult Types

5) Desire to improve the interface for the elderly: According to the survey results, 73.37% of the elderly hope that the smartphone can have a louder volume, larger

font and clearer display interface, 68.2% of the elderly hope that the smartphone can launch services to meet the needs of the elderly, such as daily health management services, online registration services for the elderly, 68.2% of the elderly hope that the smartphone can provide remote assistance function, 66.01% of older people want smartphones to provide a voice operating system to reduce the difficulty of typing (e.g., **Figure 6. Improved Wish Pie Charts**).

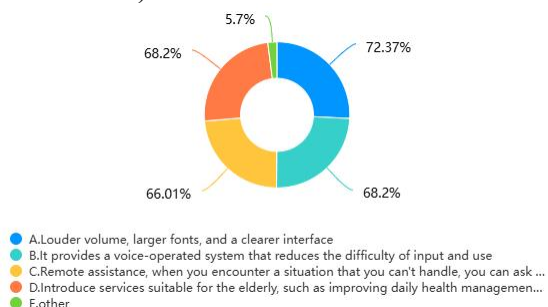


Figure 6. Improved Wish Pie Charts

Through the analysis and summary of the survey results, the team found that the elderly show a positive attitude towards the introduction of smart products into the elderly life, and they hope that the Xiyang APP can pay attention to the user needs and user experience of the elderly, especially the interface design, which should be in line with the physiological and psychological characteristics of the elderly, and the age-appropriate change of the interface design of the Xiyang APP has certain feasibility and significance[8].

3.2 Interface Design Principles for Elderly Users

Based on the unique characteristics of the physiological and psychological behaviors of the elderly, the following guidelines should be fully considered when designing the interface of the Xiyang APP to ensure that the Xiyang APP can meet the actual needs of the elderly.

(1) The principle of easy-to-read interface

Generally speaking, the use of sans-serif fonts can improve readability, so it is best to use sans-serif fonts in the process of interface production, and use text to indicate the purpose of each icon, so that the elderly who are not familiar with the page can easily understand.

(2) User experience as the central principle

When designing the interface of the Xiyang APP, the reading speed and comprehension

ability of the elderly should be taken into account. It is recommended to provide the option to close the message, and if the message must disappear automatically, make sure it stays long enough so that the older person has enough time to pay attention, read, understand, and act without stress[9].

(3) Quick navigation principles

When designing the interface of the Xiyang app, the navigation should be simple and easy to understand, and the number of child pages should be minimized, which can help to help find the information or functions they need more easily, and reduce the possibility of confusion and loss.

In short, the physiological and psychological behavioral characteristics of the elderly in the era of intelligence are complex and diverse, and the interface design for elderly users should be based on the core principles of conciseness, clarity and ease of use, while considering the physiological and psychological characteristics of the elderly, and providing necessary prompts and personalized settings to ensure that they can use the Xiyang app easily and happily[10].

4. Summary and Outlook

In the process of designing elderly care apps, developers should fully consider the physiological and psychological characteristics of the elderly, use humanized design concepts, optimize the interaction process, and improve the ease of use of the interface. At the same time, with the help of modern technological means, such as big data and artificial intelligence, advanced functions such as personalized service recommendation and health monitoring have been realized, effectively improving the quality of life of the elderly.

In future research, more innovative design methods, such as the introduction of virtual reality (VR) and augmented reality (AR) technologies, should continue to be explored, providing more immersive interactive experiences for the elderly. At the same time, with the development of Internet of Things technology, we should also pay attention to how to integrate more smart home devices into the Xiyang APP to achieve a full range of elderly life. It is expected that through continuous technological innovation and design optimization, we will create a more

convenient, comfortable and safe retirement life for the elderly, so that every elderly person can enjoy the dividends brought by scientific and technological progress.

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