Understanding interface design of health apps for the elderly based on user experience

Ying Liu [1.2, 1st], Shahriman Zainal Abidin [1, 2nd], Shaolong Yang [3, 3nd], Jie Wang[4nd]

* Corresponding author: liuying_426@163.com

[1]Faculty of Art & Design, Universiti Teknologi MARA(UiTM), Malaysia

[2]ZHENGZHOU RAILWAY VOCATIONAL & TECHNICAL COLLEGE. Henan. China

[3]ZHENGZHOU RAILWAY VOCATIONAL & TECHNICAL COLLEGE. Henan. China

[4]JOINTOWN PHARMACEUTICAL GROUP. Beijing. China

Abstract. Nowadays, the problem of the aging population in China continues to intensify, and the health problems of the elderly have become a key issue of concern to the whole society. In the context of the information age, although there are many types of health apps, involving many aspects such as medical treatment, fitness, diet, etc., the interactive interface of various apps does not consider the particularity of the elderly group at the beginning of the design, and how to design a health APP that can meet the needs of the elderly in a differentiated manner Interactive interface has become a key issue to be solved in the design of health APP interface.

Keywords. Health APP; Interface design; Senior citizen; User experience

1 Introduction

The research on the elderly health APP interface design based on user experience is an important measure for mobile terminals to keep pace with the times. At the same time, the health APP interface design is designed by groups, which can make the designed APP better meet the experience needs of different groups, thus playing the role of APP in the health of different groups. [3] This paper believes that the APP products that can meet the needs of users in a wide range of APP products are successful APP products. Therefore, the first step of the health APP interface design should be to deeply study the needs of elderly users and sort out the influencing factors of the elderly health APP interface design. Although the domestic mobile Internet has developed rapidly in recent years, surpassing the development speed of foreign countries, the use and download of mobile medical health products are not high in the face of many elderly people using mobile Internet. In addition to the impact of traditional offline medical operations and other concepts, what is worth exploring is the app itself.[5]

ITEI 2022, December 23-25, Harbin, People's Republic of China

DOI 10.4108/eai.23-12-2022.2329128

2 Analysis of influencing factors

2.1 Age factors

In social life, the elderly are often idle but faltering, rich in experience but full of dentures, this image seems to take root in people's hearts, how to divide the age of the elderly, seemingly simple but extremely complex, in the process of analyzing the age factors of the elderly China will be 60 years old and 60 years old The age is used as a criterion, and the group that meets this criterion is divided into old age, but in real life, there are significant differences in the physical health of the elderly of the same age. From this analysis, it can be seen that in the process of designing the health APP interface, this paper should target groups aged 60 and above, and fully consider the different physical health conditions of the elderly of the same age. [2]

2.2 Physiological factors

Human aging is a relatively slow process, and in this process, the elderly's motor system, respiratory system, circulatory system, and other functions will gradually decline, such as the "sensory system" in vision, if the vision of the elderly has decreased, it will not be easy to see the text presented by the health APP interface, then it is impossible to smoothly apply the health APP to meet their own health needs. Another example is the "nervous system" if the nerve cells of the elderly are reduced, peripheral nerves have aging problems, then the elderly in the process of applying health APP, the nervous system will not be able to transmit information in time, and then cause the elderly to lose interest in using health APP.

2.3 Psychological factors

At present, the elderly have psychological desires and a lack of emotional care, and the elderly often worry about being called useless by others, which seriously affects their mental health of the elderly. Then this paper should pay attention to the emotional care for the elderly in the process of designing the health APP interface, focusing on strengthening the friendliness of the APP interactive interface and the particularity of various functions, so that the elderly can experience the emotional care of the society for themselves, so that the elderly can easily control the health APP and follow the health class The APP carries out the corresponding activities.

2.4 Cognitive factors

The elderly with the continuous increase of age, their memory, thinking ability, and intelligence are aging, among which the slow operation of the brain decision-making system of the elderly is the key reason for the slow response of the elderly, at the same time, some elderly people do not have information literacy but desire to keep pace with the times. Then in the process of designing the health APP interface, this paper should pay attention to the friendliness of the APP interactive interface, that is, simple and easy to operate, increase the length of information display, so that the elderly can have enough reading time and thinking time; Set the function that can return to the home page interface with one click, reducing the cumbersome interface interaction; Or based on big data, according to the needs of the elderly, set up memory functions for health APP interface interaction. [1]

3 The design principle of combing

3.1 Pertinence

The interface design of the elderly health APP should follow the principle of pertinence, and take the "elderly" as the core role for the special group of the elderly to gradually model the framework of the interactive interface. At the same time, in the process of designing the interface of health apps, it is also necessary to consider age, physiological, psychological, and cognitive factors, and design the interactive interface from the details.

3.2 Easy to learn

The design of the elderly health APP interface needs to follow the principle of easy learning, to ensure that the designed APP interface is easy for the elderly to remember and operate, and the APP after being put into application, the elderly do not need to spend a lot of time and energy to be familiar with the operation process of the APP. In addition, designers also need to consider the psychological tolerance of the elderly, if the elderly can not achieve the purpose after multiple operations, then the elderly will lose confidence in operating the APP, and even produce negative emotions, so "simple" should be the key to the design of the elderly health APP interface. The main thrust of the easy-to-learn principle is a simple operation, easy understanding, and clear structure. [4]

3.3 Conciseness

The interface design of the elderly health APP should follow the principle of simplicity to ensure that the APP interface functions are simple, the color module is simple, and the interface presentation is concise.

4 Interface design practice: taking the interface design of medical and health apps for the elderly as an example

4.1 Analysis of user needs

4.1.1 Functional requirements

Analyze the medical health category of the elderly APP functional requirements, and subdivide functional requirements, divided into basic, willing, and attractive needs. Among them, the basic requirements cover pre-Make appointments, online consultations, finding doctors, online patient interactions, etc Must-have requirements; Voluntary needs to cover selective needs such as health monitoring, free diagnosis and treatment, and doctor recommendations, and users can make choices according to their wishes; Charisma-type requirements cover intelligent Q&A, health recommendations, rehabilitation guidance, medication reminders, and other unique needs, and the application of such functions can optimize user pairsAPP's good impression strengthens the user's pair APP of fidelity. [7]

4.1.2 Experience needs

The experience needs of medical and health apps for the elderly were analyzed, and the experience needs were subdivided, which were the sensory experience of the elderly, interactive experience of the elderly, and emotional experience of the elderly. Among them, sensory experience needs include vibrant interfaces, interfaces that look simple, and easy-to-find information in the interface; The interactive experience covers the functions of the interface that are useful to the elderly, and the information of the interface is convenient for the elderly to understand, and the operation form of the interface is simple and easy to access; Emotional experiences range from being able to feel special care for the elderly and giving them hope for improvement.

4.2 APP interface design based on user experience needs

4.2.1 Sensory-level design

a) Simplify the information framework

Common APP information frameworks are divided into four categories, as shown in Figure 1 below.

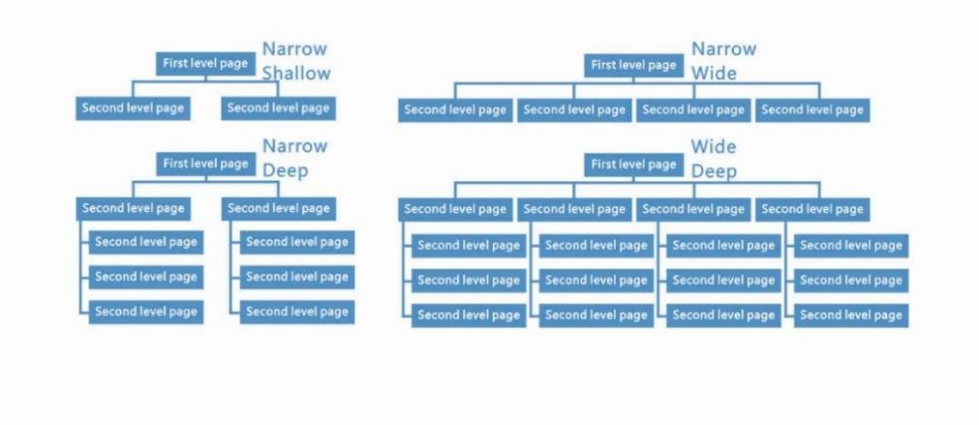

Figure 1 Common classification diagram of APP information framework

As shown in Figure 1 above, in the four types of information framework "wide and deep" is the most cumbersome, "narrow and shallow" is the simplest, then for the elderly user group, whether the selected information framework hierarchy logic is complex to a certain extent affects the user's operation error rate, to minimize the elderly in the medical and health APP interface "lost", this paper in the sensory level design practice selected "narrow and shallow" as the information framework of the APP. This helps elderly users quickly find medical information by simplifying the hierarchy.

b) Intuitive layout

The interface layout is a key step to optimize the allocation of APP information resources, and the principle of intuitiveness can make the entire APP interface information presentation more

organized in the process of interface layout. First, APP interface navigation settings, navigation settings are the navigation and guidance of page operations at all levels, under the guidance of navigation, elderly users can find the target information as quickly as possible, reducing the time for users to learn the APP interface. In the design practice, this article sets the selected navigation bar chart to be highlighted, and changes the color, as shown in Figure 2 below, this layout, on the one hand, considers the problem of weakened vision of elderly users, on the other hand, improves the friendliness of APP interface and user interaction.

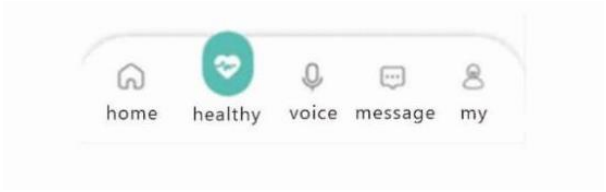

Figure 2 Schematic diagram of interface navigation settings

The intuitive display of information, from the above theoretical analysis can know that the intelligence of the elderly user group will gradually age with age, so it is necessary to intuitively process the information display of the medical and health APP interface, and straighten all functions in the APP The "tile" of the view is displayed in front of the user's eyes, and there is no hidden level function processing such as "drawer". Second, the important information and secondary information of the interface are sorted and processed, and the important information is set in the center of the interface by adhering to the principle of highlighting important information and weakening secondary information so that the elderly user group can intuitively see important information after opening the home page interface.

c) Visually reasonable

Regarding the design of visual elements, in the process of applying this APP by elderly user groups, it is necessary to use vision to obtain relevant information in the APP, so the continuity and efficiency of relevant information acquisition depend on the rationality of the design of visual elements of the APP interface. [8]To improve the efficiency of APP interface information communication, this paper makes a targeted design analysis of the following aspects of design practice, as follows: First, icon element design. Compared with text, users can quickly receive the information transmitted from graphics, according to this law, to facilitate the understanding and information reception of elderly users, it is necessary to reasonably design icon elements. The icon element style is generally divided into skeuomorphic icons, flat icons, and linear icons, of which the model selection of skeuomorphic icons is based on real objects in life, although such icon styles are more able to convey information to users intuitively, the setting of such icons is more complicated, and it is necessary to pay attention to the processing of various details of the icons, such as the three-dimensional nature of the icons, the reflective design of the icons, etc. The flat iron is a popular type of icon style in the current APP interface design, which removes the cumbersome characteristics of detail design, and the image is clear, which can also convey information to users directly. Finally, the linear icon style is relatively weak in information transfer compared to skeuomorphic and flat icons. Therefore, this article proposes to select flat icons in the process of APP interface design. Second, the design of color elements. In terms of color elements, although red, orange and other strong colors are easier for users to identify, strong

color does not fit the psychological effect of the elderly user group, according to the elderly like elegant, light pure color, this article in the APP interface design process to formulate the application of vitality, the vitality of the green system, and combined with the APP The interface function sets the upper bar of the home page and the selected area of the interface navigation to light lake green, the interface function partition line to lake green, and the secondary function display to grass green. Therefore, based on distinguishing the functions of the APP interface, the overall color system of the interface is coordinated and unified. Third, the design of text elements. In terms of text element design, it is proposed to set different font sizes according to the use scenarios of each function of the APP interface, according to the headings of each level, while strengthening the logic of text presentation at each level, so that the elderly user group can understand which functional area the interface operation at this stage is staying in through the transition of the text font size. See Table 1 below.

Table 1 Text font size and the corresponding design of its title

title	Font size design and presentation
First-level title, the main title of the APP interface	Song Ti junior
Second-level title, the secondary title of the APP interface	Song Ti No. 4
Three-level titles, small paragraphs of text in each functional area of the APP interface	Song Ti Primary Four
Four levels of headings, explanations, and notes in the APP interface	Song Ti No. 5

At the same time, in terms of text element design, this article also considers the law of outstanding contrast between color and text, and sets the contrast between the two to more than 7 degrees, breaking through the previous "black on white background" color text matching according to this standard.

4.2 Interaction-level design

4.2.1 Highlight the practicality of the function

To improve the interactive experience of elderly user groups in operating APP products, this paper fully considers the applicability of product functions in the process of designing the APP interface, and the original intention of the development of medical and health APP products for the elderly is to provide convenience for online consultation, health monitoring, health improvement, etc. for the elderly. Then in the functional display, this article highlights the online consultation function, health monitoring, and other practical functions in the "health" navigation boundary, users only need to click "health" in the navigation bar, and you can intuitively see all the practical functions of this APP. [2]

4.2.2 Improve the efficiency of information transmission

To improve the interactive experience of elderly user groups in operating APP products, this paper fully considers the efficiency of information transmission in the process of designing the APP interface and takes the accurate expression of information semantics and the simplification of information content presentation as the entry point to help elderly users accurately receive medical and health information. [10] At the same time, to reduce the difficulty of information

understanding of the elderly, this paper abandons obscure medical terms in the APP interface design practice, selects text information with living semantics, and gives information more interesting. For example, get more sun - prevent osteoporosis - pay attention, and do not bask in strong light in summer! Another example, walk more slowly - strengthening gastrointestinal peristalsis - paying attention, and resting when you are tired of walking! Therefore, the information template of "health behavior + benefits + precautions" is used to convey health information to elderly users based on the semantics of daily life, making it easier for the elderly to obtain health information.

4.3.3 Reduce the cognitive burden of operation

Cognitive burden mainly points to the user's inability to effectively process the information in a short time in the face of a large amount of information, and then causes the user's cognitive pressure, to reduce the user's cognitive burden at the APP interface operation level, this paper makes the following settings in the APP interface design practice, one, Reduce the excessive operation elements and operation steps in the process of interface operation and ensure the orderly operation of the interface. Second, the most common interface interaction design pattern of the application imitates the main interface design pattern of the Android mobile phone system, to reduce the strangeness of the elderly user group after opening the APP. Third, the interface operation is guided by the design of the interface, and the user is guided to operate the function for the first time for the user to operate the function for the first time, and the intelligent language is configured for each boot operation.

4.3 Emotional level design

To give special emotional care to the elderly user group, this article designs intimate and caring quotes in the first login interface of the APP. At the same time, to give elderly users more hope for recovery, a dialog box of "rehabilitation circle" is set up at the top of the APP interface, in which users can see the messages of elderly patients on the APP, rehabilitation experience, disease course self-management methods and so on. This allows users to obtain more positive energy through the APP.

4.3.1 Design practice

Product positioning. This study named the elderly medical and health APP products as "doctor to one", in which "medical" mainly refers to online doctors, online medical and health knowledge, etc., and "one" mainly refers to the user group of the elderly, and the meaning of "medical to one" means that every elderly person has a "doctor" to accompany, so that every elderly person can obtain relevant medical and health knowledge. The target users of "Doctor to One" are middle-aged and elderly people aged 45 and above, after the age of 45, the physiological functions of the human body begin to decline, and they are very susceptible to chronic diseases, so the target users are expanded from theoretical 60 and 60 years old 45 years and older. The storyboard design diagram is shown in Figure 3 below.

Figure 3 "Medical to One" APP storyboard

As shown in Figure 3 above, the storyboard of the "Doctor to One" APP covers a total of 4 scenarios, and the content design of each scenario is as follows:

Scenario 1: I'm finally retiring after working for decades, but my fitness has also come down as I get older, so I plan to start studying my physical condition shortly to help me stay healthy.

Scenario 2: But I don't know much about health care, and the information on Kuaishou and Baidu, and commercial advertisements also make me half-believe, which makes me feel very distressed.

Scenario 3: After the neighbor Lao Li learned about it, he recommended the "Doctor to One" APP and taught me how to operate it, Lao Li said that this "Doctor to One" can help us a lot, can talk with doctors online without leaving home, and can also obtain the most professional health care information.

Scenario 4: I downloaded the "Doctor to One" APP and used it for a few days, and found that the experience was very good!

After the scene, the "Doctor to One" APP interface presents to the user "Nice to meet you, Xiaoyi will accompany you in the days to come!" Caring quotes.

4.3.2 Examples of interactive interface design

This section designs the information framework of the "Doctor to One" APP interface for the sensory experience needs of the elderly user group, as shown in Figure 4 below.

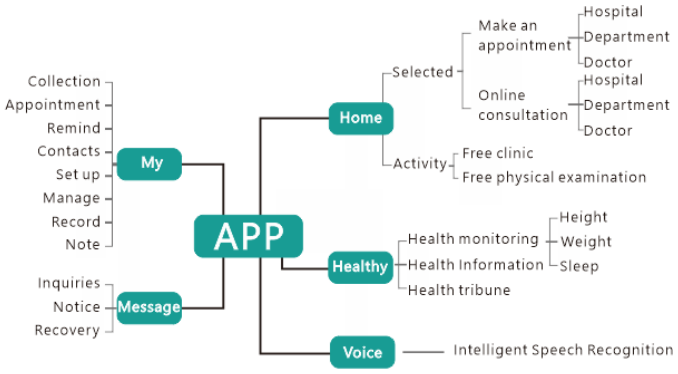

Figure 4 Information framework of the "Doctor to One" APP

As shown in Figure 4 above, in the "Doctor to One" APP, the information framework is set up with five functional areas: "Home", "Health", "Voice", "My" and "Message". And each functional area corresponds to the detailed functions related to health recuperation, such as "health" which corresponds to health monitoring, health information, rehabilitation circles, and "add equipment", in which the additional equipment can meet the APP Connectivity with smart health devices, such as watches that record steps, heart rate, and heartbeat. For example, "my" corresponds to the collection, like, follow, have made an appointment, medication time reminder, contact children, etc., in the "my" information framework, most of the secondary branches echo the "home" function and "health" function, the "collection like and attention" is mainly aimed at

the interaction between users and health information and rehabilitation circle, and "booked" is mainly aimed at "appointment registration". Figure 5 is a simple rendering of this APP。

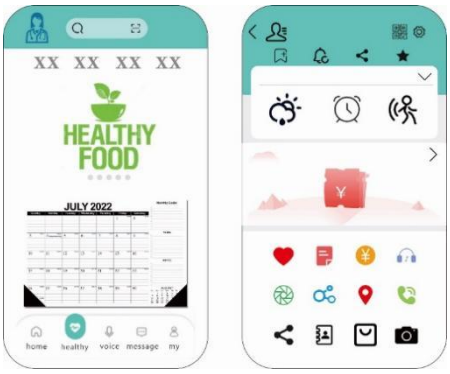

Figure 5 System effect

5 Conclusion

In summary, this paper summarizes the influencing factors of APP interface design around the interface design of health apps for the elderly, analyzes the basic principles of APP interface design, and then deeply explores the whole process of medical and health APP interface design based on user experience requirements. Through the above theoretical analysis in this paper, it is clear that designers need to pay attention to the particularity of the special group of the elderly in the practice of designing the interface of health apps for the elderly and try their best to simplify text presentation, simplify interface operation, and intuitive interface presentation. In general, for the elderly group, health APP not only has the role of medical service intermediary, but also can popularize more health knowledge for elderly users to a certain extent, and optimizing the interface design of health APP is a key measure to promote the function of such APP. Therefore, in future development, relevant designers still need to continue to optimize the design of health APP interfaces based on the particularity of the special group of the elderly.

Experimental study on the therapeutic effect of iPSC-MSCs and its exosomes on COVID-19 pneumonia, Key Scientific Research Projects of Higher Education of Henan Province (23A310033)

References

[1] Abidin, S.Z., Bjelland, H.V., & Øritsland, T.A. (2008). The embodied mind in relation to thinking about form development. In Proceedings of NordDesign 2008 Conference (pp. 265-274).

[2] Liu Ying. Research on interactive design based on artificial intelligence, Revista de la Facultad de Ingenieria, 2017:pp 613-618.

[3] GUO Min. Design and implementation of Android mobile phone health assistant APP for the elderly[D] Jiangsu University, 2019

[4] XING Yawen, ZHANG Jiawen, WANG Jingjing Establishment of health monitoring bracelet model for the elderly and research design of APP[J]. Design,2019,32(12):134-136

[5] WANG Lu. Research on the interface design of mobile medical health APP based on the cognitive psychology of the elderly[D] Inner Mongolia Normal University, 2018
[6] HUANG Zheng. The interactive interface design of middle-aged and elderly medical and health APP based on user experience[D] Hunan Institute of Technology, 2021
[7] Toyong, N., Abidin, S.Z., & Mokhtar, S. (2021). A Case for Intuition-Driven Design Expertise. In A. Chakrabarti (Ed.), Design For Tomorrow - Proceedings of ICoRD 2021 Volume 3 (pp. 117-131). (Smart Innovation, Systems, and Technologies; Vol. 223). Springer Science and Business Media Deutschland GmbH. https://doi.org/10.1007/978-981-16-0084-5_10
[8] Abidin, S. Z., Sigurjonsson, J., Liem, A., & Keitsch, M. (2008). On the role of forgiving in design. In Proceedings of E&PDE 08, 10th International Conference on Engineering and Product Design Education (pp. 365–370), Barcelona, Spain, DS46-1.
[9] Jamaluddin, M.S., Zulkapli, M.F., & Zainal Abidin, S. (2013). The characteristics of form concerning product emotion. In Proceedings of the 15th International Conference on Engineering and Product Design Education: Design Education - Growing Our Future, EPDE 2013 (pp. 716-721)
[10] Mohamed Kamil, M.J., & Abidin, S.Z. (2015). Unconscious interaction between human cognition and behavior in the everyday product: A study of product form entities through freehand sketching using design syntactic analysis. In Proceedings of the 17th International Conference on Engineering and Product Design Education: Great Expectations: Design Teaching, Research and Enterprise, E and PDE 2015 (pp. 369-374). The Design Society.