Empathy Design Research in Mobile Medical APP Interface

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Abstract: From the perspective of "User-Centered", the empathy design in the mobile medical APP interface is researched. Based on the theory of cognitive psychology, and the unique cognitive characteristics of mobile medical users, the empathy design method of improving user experience is explored from three aspects: visual aesthetics, behavioral efficiency and emotional resonance, and combining with practical design to verify. Applying the empathy design method to mobile medical products has improved the early identification of users' fuzzy requirements, behavioral guidance in information transmission, emotional experience in the process of interaction, actively created pleasant aesthetic perception and emotional resonance.

1. Introduction

With the advent of the Internet+ era and the popularization of smartphones, the mobile medical APP is a convenient and fast new medical model that has received wide attention from users. As a kind of "User-Centered" design method, empathy design is the exploration of surface design to the needs of users. Establishing contact with users in the early stage of design ambiguity, understanding the user's intentions through empathy observation and interviewing, and understanding the potential cognitive needs behind the surface problems are of great significance to enhance the core competitiveness of products. "Speech reveal thought,deportment represent aspiration",the traditional market research method is mainly based on questionnaires, focusing on how users say it; while traditional design research methods focus on observing how people do it, often overlooking deeper Experience: the user's intuition, feelings and dreams [1]. Only by linking the user's language data "saying", behavioral data "doing", emotion and dream data "thinking" can the balance between rational and emotional factors be realized, thus truly understanding user, the "emotional window" that resonates with it [1][2]. The relationship among these three is the "Say-Do-Think" model in the experience design, as shown in Figure 1.
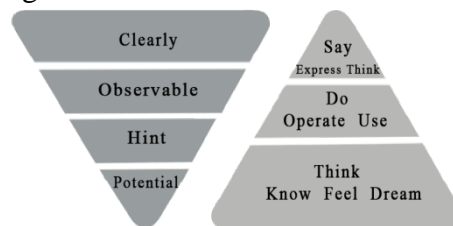

Figure 1 Empathy Design Visualization Source IIpo Koskinen "Speak-Do-Think" Model

2. Based on the Visual Aesthetic of "Saying"

The visual channel is the main way for people to receive external information and generate the first impression. The color in the interface can be communicated to the deepest nerve center, the main area that affects people's spiritual and emotional experience [3]. Based on the visual aesthetic of "Saying", mobile medical APP conveys language content through color, layout and graphic, affecting users' behavior and generating different emotional interlacing. For example, "Good Pregnant Mother" is committed to helping users prepare for science, providing accurate and emotionally-friendly pregnancy records and knowledge assistance. The interface is mostly romantic pink, and the fetal movement button is designed with the shape of a baby's small ankle. The wavy

lines are partitioned to highlight the emotional care of humanity. The medical APP interface design for seeking medical advice is more convenient to use, fresh and bright, and the refined universal interface guarantees a pleasant operating experience.

2.1 The Sense of Tranquility In the Industry's Color Design

At least 80% of the information in the interaction process is visually obtained, and the content that the eye sees is encoded into neural activity information that is transmitted to the brain to form a feeling. Color can stimulate or imply individual subconsciousness, causing subjective cognitive associations, triggering different emotional feelings [4]. For example, children's APPs are mainly composed of high-purity and high-saturated bright colors such as red and green to attract children's visual attention. Mother and baby products are mainly warm colors such as pink, which conveys a strong warmth. Pure white, blue and other light tones convey pleasant and calm information, so that users are in a state of tranquility, relieve anxiety, and create a comforTable atmosphere, which is widely used in medical product design.

2.2 Trustworthy Slab Layout

A reasonable layout can bring a sense of psychological pleasure while effectively transmitting information. By building awareness of the user to aid design, the primary focus should be on how quickly users get the information they need, and secondly on building trust. The vertical layout is a common layout method in the mobile medical APP interface empathy, and the content is hierarchically divided from top to bottom, which improves the browsing efficiency. At the same time, the interface design should pay attention to the classification of the content, to ensure that the interface layout is clearly visible, in order to prevent the information volume from being too large and causing confusion.

2.3 Branded Graphic Design

Branded graphics can transfer emotions in life experience, making it easy for users to find familiar cognition and improve the recognizability of interface information. The Clove Doctor App uses the similar appearance properties to carry out emotional transfer, the "Finding a Doctor" icon Abstracts the cross cap worn by a doctor while working, and the "Finding a Drug" icon is a linearization of the appearance of a "Capsule". This graphic design is simple and intuitive, highlighting the unique brand identity of the medical industry.

3. Behavior Efficiency Based on "Doing"

Empathy design activates inspiration through communication with users, but does not end with inspiration [1].The key to the high performance of mobile medical APP based on "doing" is to thoroughly analyze users' behavior habits and understand how users perceive, experience and feel in the process of using their products. Simple operation and reasonable process can lead to the sense of conquest and satisfaction in the operation of user behavior. Fully understand the user's behavior habits, can more accurately understand the user's emotional changes, make information quick and optimize the experience path, and bring users an efficient and smooth behavioral operation experience, and obtain emotional pleasure.

3.1 Quick Access to Information

The mobile end relies on powerful sensors ranging from the physical button operations of the command line to the popularity of multi-touch technology, aiming to provide users with a powerful and user-friendly design. Information acquisition of efficient mobile applications is more likely to generate good feelings, optimize the mobile medical APP interface hierarchy, reduce the depth of operations, and enable users to quickly find the required functions, saving time and cost. For example, "Doctor Clove" and "Spring Rain Doctor" prioritized the function of "Quick Questioning" based on the 3D Touch technology of IOS platform. By pressing the icon of "Doctor Clove" or " Spring Rain Doctor " on the desktop, we can quickly start the program to complete the functions of

graph and text inquiry, which reduces the tedious operation of searching function inside APP, and provides convenience for people to see a doctor in time.

3.2 Experience Path Optimization

Optimizing the experience path according to the actual usage scenario can help users reduce the cost of thinking and achieve the unification of user experience and usability [5]. For example, "Micro-medicine" mobile medical technology makes full use of the advantages of mobile Internet information technology, integrates hospital medical service processes, and optimizes and improves the way of seeking medical consultations to a certain extent, thus triggering the ease of use of online medical treatment, achieving efficient and convenient medical service, as shown in Figure 2.
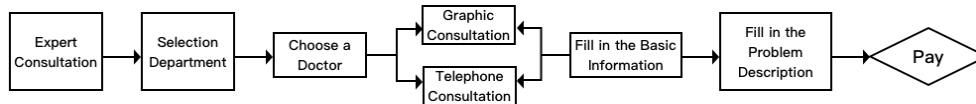

Figure 2 "Micro-medical" Consultation Path

4. Emotional Resonance Based on "Thinking"

The mobile medical APP is based on the "Thinking" emotional resonance to establish an emotional bond with the user through empathy design, and to understand the users' thinking mode while experiencing the user's medical status, so that the interface design can be visualized. Pleasant things often give better value and are easy to understand and learn [6]. mobile medical APP interface empathy design research can enable users to achieve "Physical Pleasure" to "Social Pleasure" to the "Psychological Pleasure" finally goes to the "Spiritual Pleasure" soul sublimation, which triggers emotional resonance [1].

4.1 Customized Interface Design

The differences in individual users make different users have different views on the same product interface. The customized interface design can provide users with customized module settings. Users can tailor the layout according to their own habits and preferences, flexibly adjust the layout of the page, customize the system functions, change the skin or other visual factors, and satisfy the user's product, to meet the user's psychological expectations of the product, enhance the comfort of operation, and increase the autonomy of use.

4.2 Humanized Feedback Tips

Interactive feedback focuses on detail design and provides the necessary, positive and immediate feedback during the use phase to enhance the user's sense of accomplishment. No feedback or unfriendly response is like an isolated individual, giving users a negative experience of helplessness [7]. Therefore, through the impressed real-time micro-interaction feedback design, the user's needs are responded in time to confirm that the behavior is accepted and guide the user to operate the product correctly, so that the operation behavior becomes clear and smooth, and the product is more humanized.

5. Practice Verification of Empathy Design

The "Yida" app is a platform-based mobile medical application for patients and doctors, dedicated to creating emotionally valuable inquiries and purchasing software. From the perspective of user needs and emotional experience, the user-friendly interface is designed to be easy to use, and the functional modules of "Quick Consultation", "Quick Purchase of Medicine" and "Health Management" are formed to realize sensibility and rationality. Realize the balance between perceptual and rational needs, and obtain ideal medical experience.

5.1 Analysis of the Empathy Design of the "Yida" Interface

5.1.1 Industry Characteristics of the Theme Style

"Yida" App high lights the characteristics of the industry through color and layout, and highlights the medical attributes and personalized thematic style on the premise of ensuring the readability of information. The "Homepage" uses the soft lily white as the theme color to create a pure and calm medical situation. The bright colors assist and increase the layering of the interface. In the form of vertical column layout, the content priority is divided from top to bottom, and the banner is automatically displayed by the banner of the latest medical information hotspot, which improves the browsing efficiency. The content can be freely customized to choose the module, clear and intuitive card-style information can make the user's anxious mood relieved.

5.1.2 Visualized Linear Icons

Linear icons can accurately convey information, keep consistent with the overall interface design style, highlight the characteristics of product content. [8] The linear icon in the " Yida " interface will be used to experience the medical experience, using simple lines to accurately outline the shape of the icon. "Quick Consultation" turns a doctor's commonly used stethoscope into a smart line that conveys emotional cognition. The "Preferred Drug Shop" is designed to design the appearance of the medicine box, and to send the user the prompt information for purchasing the medicine to improve the recognition of the element. "Self-evaluation" is like a test report. The poly line indicates the change of heart rate, suggesting that users can click here to quickly evaluate and conduct health management.

5.1.3 Convenient and Efficient Operation Process

The ease of use mobile applications is reflected in the user's ability to perform interactive operations easily and efficiently. The operation flow of the" Yida " APP interface empathy design is based on the "Doing" behavior. The tabbed navigation optimizes the interaction level, and the main content of the page is modularized, so that the operation is simplified and given to the user. Come to a clearer and more intuitive visual path. In the perceptual visual design, the rationality of rigor can promote users' sense of trust, enhance the interest of products and the ease of use of interaction.

5.2 Interface Empathy Design Test and Evaluation

5.2.1 Questionnaire Design and Statistics

Table 1 "Yida" APP Interface Empathy Design Usability Test Results

Index	Segmentation	The Average Score	Total Score
"Yida" Interface Empathy Design Usability Test Statistics			
V. Visual Language	V1　Consistent Theme Style	4.2	4.2
	V2　Fresh and ComforTable Color Matching	4.3	
	V3　Reasonable Layout	4.0	
	V4　Icon Element Visualization	4.5	
	V5　Information Readability	4.2	
B. Behavioral Interaction	B1　Reasonable Product Structure	4.3	3.9
	B2　Clear Navigation Path	4.1	
	B3　Smooth Interaction	3.7	
	B4　Quick Access to Information	4.0	
	B5　Timely and Friendly Feedback Response	3.6	
E. Emotional Experience	E1　Customized Content Push	4.2	4.5
	E2　Personalized Settings	4.3	
	E3　Humanized Care	4.5	
	E4 Simple and Easy to Use Sense of Accomplishment	4.8	
	E5　Pleasant Emotional Experience	4.6	

The "Yida" APP tests the usability of the interface empathy design from the V-visual language layer, the B-behavior interaction layer, and the E-emotional experience layer. The degree of user

satisfaction is "Very Agree", "Agree", "General", "Disagree" and "Very Disagree", and the corresponding scores are 5-1 points. Nielsen's statistics show that 5 different levels of users participate in the test to get 85% usability issues [9]. Therefore, the usability test of the empathy design of the "Yida" APP interface recruited 10 representative users of different levels to be divided into two groups for testing. The results of the questionnaire test were counted by using the ratio of 1:1 male to female. Take the average of each indicator subdivision and the average of each major category, and use this as a basis to create a quantitative model evaluation as shown in Table 1.

5.2.2 Evaluation of Quantitative Models

Create quantitative analysis of empathy design through the results of usability test feedback statistics. As shown in Figure 3, empathy design theory has a positive impact on the usability of the interface: the comprehensive average of the three indicators is higher than 3.8 points, and the average value of the sub-contents under each index is higher than 3.5 points, which belongs to the positive feedback interval. The comprehensive average of the indicators of the emotional experience layer is 4.5 points, which is the highest indicator. It verifies the simple and easy-to-use sense of accomplishment and the pleasure of emotional experience of the "Yida"APPinterface empathy design.4.5 points in V4 is divided into the highest score in the visual language layer indicator, reflecting the emotional visualization of the icon element. B1 is the highest score in the behavioral interaction layer indicator, indicating that the product architecture is reasonable.
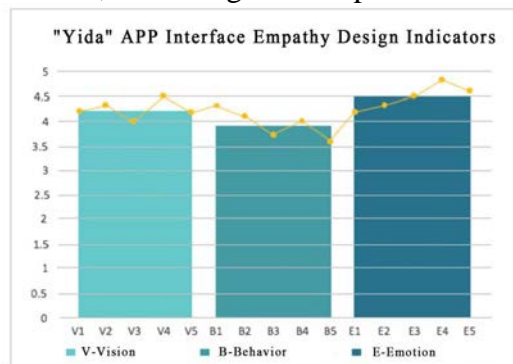

Figure 3 "Yida" APP Interface Empathy Design Quantitative Model Diagram

Quantitative analysis and evaluation provides a theoretical basis for the empathy design of the interface. In the follow-up work, it is necessary to continuously test, evaluate and improve to improve the final availability plan.

6. Conclusion

With the accelerated pace of people's life and the enhancement of self-health awareness, new medical treatment models such as mobile medical APP are becoming more and more popular. At the same time, due to the large differences in user groups, users' needs are also more diversified due to factors such as age level, professional knowledge and medical pressure. The empathy design theory based on the mobile medical APP interface strives to understand the empathy of the user, making the product more targeted and highlighting the humanistic care of the medical product, in order to stimulate the user's emotional resonance and ease the anxiety state in the medical treatment. In the future, with the continuous popularization of medical applications, the more detailed user groups and the in-depth application of artificial intelligence technologies, more opportunities and challenges are proposed for the exploration of empathy design methods.

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