

Analysis of User-Centered Design of Small Medical Products

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Abstract: This article from the small medical products research status quo of humanized design for the starting point of design, We analysis the relevant factors of humanized design, including the user characteristic model, user behavior model, interface model and environmental characteristic model and then analyze small medical products man-machine interface. Finally, summarized the small medical products humanized design principle.

Current Situation of Research on User-Centered Design for Small Medical Products

Humanized design concept has special significance to the design of medical products. The humanized design study of medical products has increased in recent years, although be in, but also includes several aspects of the humanized design. From the aspects of method process, emotional design and modeling are some research results for reference.

Yuan Hefa Ding Wei and Chen Shenren put forward the humanized product design ideas and principles simply, and emphasized to strengthen people's usability and demand research to embody the people-oriented design objective attaches great importance to the emotional design of medical equipment and its effect on the person's psychology, meet people's spiritual needs [1]. In the medical products of man-machine interface design should pay attention to: the design, the knob design fluctuate, display part and details.

In addition, in this field abroad has a lot of good case. Its design idea is worth using for reference. Products such as shown below.



Figure 1 Seth Reflex Hammer

Pictured above is a combined stethoscope and percussion hammer design. Designers by looking

at the doctor's daily behavior, find them if at the same time with these two instruments is not very convenient, many doctors with stethoscope as a percussion hammer to use directly, so that may be harmful to the stethoscope [2,3]. So the combination design was the result. To China hospital survey, we found the same problem. This shows that mastery of medical personnel behavior characteristics is very important. (see figure 1)

Research on Relevant Factors of User-Centered Design for Small Medical Products

Small medical products humanized product namely inside environmental harmony, embodied in the harmony of the whole treatment process, is the user, the use of the harmony between the environment and products [4]. Combining the above analysis, it can be seen that command of the user characteristics and behavior is the key to the humanized design, From the system point of view, it can be divided into the user profile model, user behavior model, interface model and environmental characteristic model.(see figure 2)

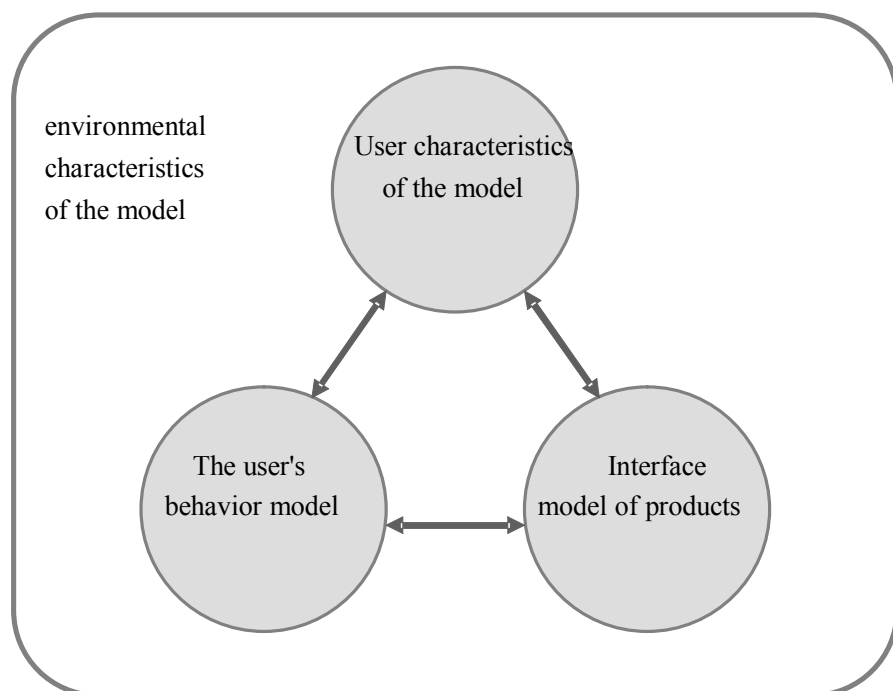


Figure 2 Model about factors involved in user-centered design

Model of User Character

The user characteristic model is the model reflect the features of the crowd, generally including physiological and psychological characteristics. Medical products related people to operate the products mainly include health care workers, patients receiving treatment, and other related people.

The operator of the medical product: all kinds of medical staff, including: Doctors, nurses, anesthetists etc. Those aged between 18 to 60, including nurses in women is more, So considering the anthropometric data, biomechanics, human body movement characteristics of the design, we will give attention to both these groups.

Treatment: Medical products to treat the recipient - the patient. Relatively speaking they are a disadvantaged group, suffered varying degrees of illness so that they produced a series of psychological and physiological changes [5].

Other related people: There are some indirect contact with medical products, Such as medical products agents, the family. These people although there is no medical products in use, but the product form to their feelings, and observe the scene when the rest of the population use the product produced by the psychological feelings also can form positive or negative self-talk.

Model of User Behavior

User behavior refers to the user in order to complete certain tasks to take all the purposeful actions. User behavior model can reflect the working process of the user, the content and behavior characteristic, and user action in the process of various characteristics, habits and preferences, etc. User model analysis generally occurred in the early stage of the product design, to the late designer to design products to make some preparations.

Model of Product Interface

Interface model of product, is the product of interface to complete the task and the situation and the countermeasure of implement hypothesis, using the method of simulation carries on the preliminary analysis and research. Functional interface is when designing medical products man-machine interface must first consider the interface. In addition, the interface of the medical product to consider security, namely the man-machine interface can't direct physical damage of medical staff and patients, and should have a certain tolerance and mistake proofing, can overcome all kinds of emergencies in the process of medical risks, ensure safe use of system failure.

Model of Environment

Medical products as a special environment and the situations of the product, its design must take into account the use of its special environment. At the same time, the medical products must not only be coordinated with the overall environment characteristics of wards, the hospital, also should pay attention to coincide with the characteristics of other medical equipment. Although the ward is divided into a lot of kinds, such as general wards and intensive care unit, but all have the common characteristics. General pursuit has the characteristics of quiet, peaceful, clean the environment as a whole. Accordingly, we also try to cooperate on environmental Settings for this feature. For example, in terms of color selection, ward wall, bed sheets, etc. The main color is white, the color collocation is cool colors such as white and light blue, light green, the collocation of color is given priority to.

Analysis on Man-Machine Interface of Small Medical Products

Generalized human-machine interface: Man-machine system including man, machine and environment three components, they are integrated to connect with each other. The operator first perceived display indication feedback and changes of signal, to carry on the analysis according to the change of information, and make the corresponding decision, and then through the machine to achieve the control of operation of the adjustment process, the formation of the whole cycle, process communication [6]. In the man-machine system model, the existence of an interaction surface between man and machine, known as the "human machine interface", all the information communication and control activity occurs in the man-machine interface.

The narrow sense of the man-machine interface is refers to the human-machine interface in the computer system. Computer system is composed of computer hardware, software, and to the man-machine system. The man-machine interface for the user to provide the perception of image, user support use of knowledge, experience, perception and thinking of obtaining the interface information, and complete the human-computer interaction equipment. The man-machine interface is between the user and the computer system, is between man and computer, the exchange of information transmission media, is a comprehensive operation environment for users to use a computer system.

The interface design include: The medical personnel - medical system products, patient - medical systems products, other related personnel - product of medical system interface; from the composition of medical products to points, can be from the display interface, and morphology of the product to study; the author discusses medical system product man machine interface from the

above aspects.

The Design Principles of Small Medical Products

Principles of Vision Design

Vision is one of the people to accept the information the most direct way, which is based on things and vivid visual impression, jump through the form of thinking fly logic, the essence and law of things directly grasp. According to the scientific research information obtained, normal people get on in life 80% from the vision. For the design of medical devices to words, visual importance can not be ignored.

Principles of Hear Design

Sweet voice can make people's heart, can eliminate the fatigue of the people, can make the person mind; In general, the appropriate music relieve pain, tension, fear, promoting disease rehabilitation, harmonious doctor-patient relationship, and so on. Relaxed and cheerful music in the brain and the nerve function improved, rhythm and lively refreshed, eliminate fatigue; Slow, graceful music has analgesic, step-down, composed, and the function of regulate mood [7]. If the medical equipment involves voice should pay attention to the following principles.

Principles of Touch Design

As with other products, medical products touch is typically as far as possible to achieve two things: First, it is through the product surface texture so as to achieve the required touch; second ,it is through the material of choice to achieve good touch [8]. To achieve these two requirements, generally follow the following principles:

(1) selection of materials humanization

We should strive to humanity on material, increase the affinity of products, reduce the coldness of medical equipment.

(2) the surface treatment of rationalization

The equipment surface texture to tactile aesthetic(mainly including simple treatment, texture, concave-convex processing) , to ensure safe and efficient use, pay attention to the accurate application of product semantics(including concave and convex, tips, tactile feedback, etc.)

Conclusion

According to the above analysis, it is concluded that the following medical care equipment product form design principle:

(1) the principle of usability, medical equipment is functional product, so it is very important to guarantee its ease of use.

(2) The principle of affinity , the overall shape of the medical equipment to a gentle, kind, patient can generate the sense of security and trust, reduce the patient's psychological burden.

(3)The principle of integrity, including the overall in two ways, one is the tacit cooperation between various components of the equipment itself, the second is the equipment, the coordination between the equipment and the environment.

(4) the principle of economy, in the real production, not only consider the modeling is novel, also want to consider the feasibility and cost of production and manufacturing problems.

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