Thoughts on product industrial design in an aging society

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Abstract: A high proportion of the elderly population will increase the burden on society and affect its development. With the increasing age, the physical function of the elderly gradually weakens, and the demand for barrier-free products for the elderly also increases. Therefore, the products developed by product designers using the concept of caring design are favored by the elderly and meet the requirements for barrier-free use of products. Product designers should know the relevant knowledge and information at the early stage of product design, so as to make the product conform to the characteristics and operating habits of the elderly in the design process. Make the design close to their lives, so as to help them. Based on the industrial design of products in an aging society, this study tries to analyze the real needs of the elderly for products by combining their physiological, psychological and behavioral characteristics. On this basis, the usability theory of products for the elderly is deeply analyzed, and the semantic popularization of products for the elderly is realized by combining the relevant knowledge of product semantics.

1. Introduction

The early arrival of an aging society will have a profound impact on China's society, economy and culture. The young and middle-aged labor force will decrease accordingly. Economists believe that China's demographic dividend is almost exhausted. However, if the proportion of the elderly population is too high, it will increase the burden on society and affect the development of society. With the increase of age, the physical function of the elderly gradually weakens, and the demand for barrier-free products for the elderly also increases [1-2]. Therefore, the products developed by product designers using the concept of caring design are favored by the elderly and meet the requirements for barrier-free use of products. In this unprecedented social state of advanced age, our living environment began to produce different needs [3]. Product design should adapt to this change, form a new design concept based on "aging" and try to solve the problems in life for everyone. Nowadays, the degree of aging in society is deepening, but it is not very common to develop and design products that are really aimed at the characteristics of the elderly. Paying attention to the design of products for the elderly will be a trend and an opportunity. In the field of product design, it is particularly important to grasp and apply the principles of industrial design of products for the elderly.

2. Problems faced by product design in an aging society

With the increase of age, human organs will degenerate irretrievably, which is mainly reflected in the decline of vision, hearing and limb motor function [4-5]. As a group, the elderly have both common needs and individual needs influenced by region, culture and age. Common needs are determined by the overall development trend of the elderly. Therefore, the common characteristics of the elderly guide the development trend of the demand for products of the elderly and become the fundamental factor in positioning the products of the elderly.

The rapid development of the aged society has brought a series of social problems, such as the lack of medical system, the backwardness of the old-age service system and the shortage of nursing and rescue personnel. These problems are no longer simply limited to the elderly, but also support

the main force of society-the affordability of young people, the supply balance of material life, and so on, and affect the whole social system in which we live from all aspects [6]. At present, most of the existing product designs are designed and manufactured according to the needs of healthy teenagers, which can not adapt to the changes of the physical function of the elderly.

It will be a powerful weapon for modern enterprises to win in the future market competition to pay attention to the potential needs of the elderly to adapt to the development of the times and consider interactive product design for the elderly one step ahead of time, so that the elderly can change from "fear of new products" to "easy use of products" and even to "enjoy products" at a higher level, weaken and eliminate the gap with the times and fully enjoy the convenience and fun brought by science and technology. During the aging process of human body, the physiological and pathological changes in the body will directly or indirectly affect the static and dynamic measurements of the elderly body and the functional measurements of related systems and organs. Product designers should know the relevant knowledge and information at the early stage of product design, so as to make the product conform to the characteristics and operating habits of the elderly in the design process. Make the design close to their lives, so as to help them.

3. Industrial design of products in an aging society

3.1. Usability design of products for the elderly

For users, the usability of products is an important factor that affects their use and purchase of products. If the product is difficult to use, users will decisively abandon it; If the product is easy to use, but the functional requirements cannot be met, users will not use [7]; The usability theory is further refined, and the usability of products is divided into five aspects, as shown in Figure 1:

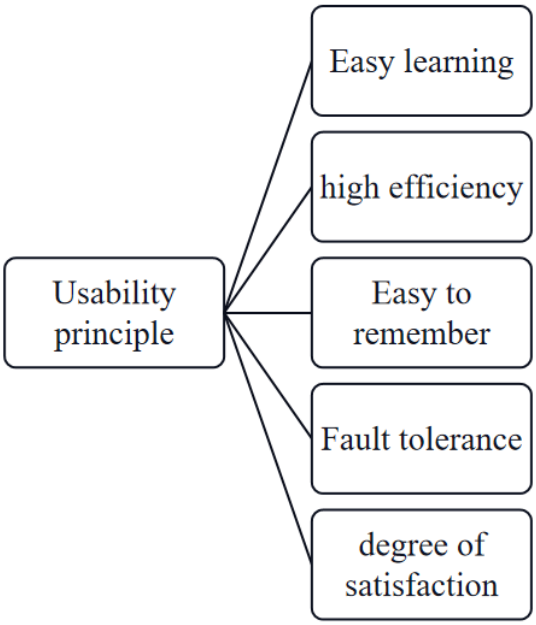

Figure 1 Ease of use of products

Old people have a habit of learning about the use of products. For products that have used the same kind, they can transplant their original experience to this product. In the industrial design of products for the elderly, semantic constraints and cultural factors can be used to effectively narrow the range of possible operation modes of products, reduce the selectivity of operation, and even guide the operation and reduce the learning burden. Therefore, paying attention to the visibility and feedback of products can make the use of products easier for the elderly [8].

It is best to systematize and standardize the semantic symbols of products for the elderly. That is, those symbols that express the same meaning but have different forms are managed in a unified and standardized way. This can effectively reduce the study and use time of the elderly, and reduce the chance of being confused by semantic content. It is a huge project to study the elderly's

understanding of product semantics in the early stage of design. It is necessary to conduct repeated research to test whether their products are well understood by the elderly. The standardization of semantic symbols also provides a smooth transition platform for product upgrading.

There is a certain generation gap between the cognitive habits of the elderly for products and the popular semantic elements of current products. This is mainly because the old people's intensive absorption of product knowledge is in their youth and adulthood. In the industrial design of products for the elderly, we should combine the use mode of products with the operating experience of the elderly, so that they can understand the basic operating mode of products when they see the shape of products. Therefore, it is very important to simplify the information and operation steps of scientific and technological products for the elderly. Using semantic symbols of products can effectively reduce the selectivity of operation and the filtering of interference information [9]. Through standardized features, the adaptation time can be effectively shortened, so that the elderly can use the products quickly and efficiently.

3.2. Interactive design of products for the elderly

Products with interaction as the main feature are called product interaction. Most of these products are modern information products embedded with smart chips, such as computers, digital cameras, mobile phones, Internet products and office automation products, etc., while traditional household appliances, automobiles and other products with obvious interaction characteristics also belong to product interaction. Product interaction is characterized by a high degree of interaction with users, which is mainly reflected in the functional usability and user experience of products. The idea of product interaction design is shown in Figure 2:

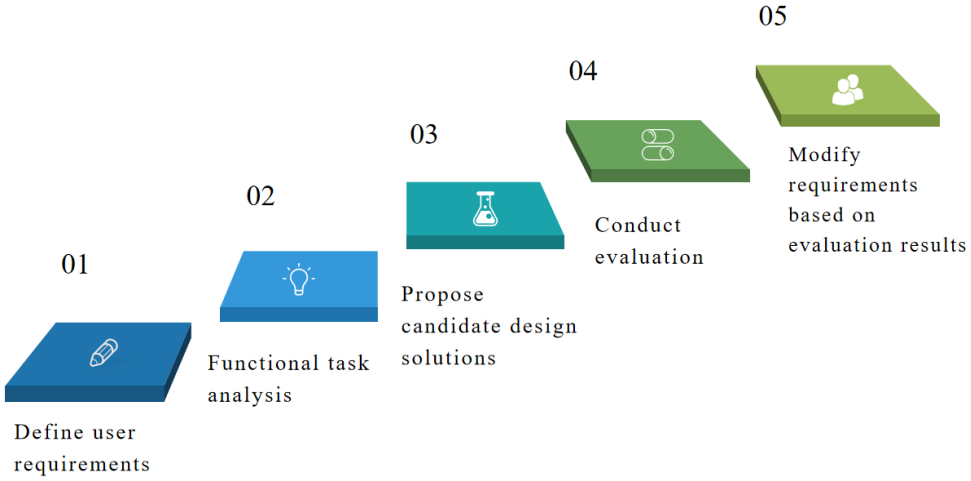

Figure 2 Product interactive design thought

Direct and simple interaction can effectively make up for the obstacles caused by the deterioration of cognitive ability of the elderly and dispel their concerns when using new products. In the future, people will pay more attention to the quality of life and physical health, and operating natural product interaction will be more conducive to the physical and mental recuperation of the elderly. Designing the use of products according to the natural cognition and action habits of the elderly can increase their subconscious information acceptance and operational adaptation, and promote the realization of the interactive process.

The process of designing products is the process of establishing contact, and it is to establish contact with people's needs, aspirations and even culture and the world in which they live. Designers don't have to blindly pursue high technology when developing the interaction of products for the elderly, and often improve or continue some traditional products to achieve good interaction results [10]. Of course, the purpose of excellent product interaction for the elderly is still unified, that is, instead of isolating the elderly from the public, it can help them better integrate into society, which is of great positive significance to social harmony.

Besides providing faster, safer, more comfortable and healthier use, products should pay

attention to psychological care for the elderly, and emphasize emotional communication between products and the elderly, that is, the interactive experience that products bring to the elderly. Develop product interaction suitable for the elderly, and help the elderly maintain a good and pleasant psychological state and a wide range of interpersonal relationships through active emotional experience activities.

3.3. Physiological and psychological design of products for the elderly

Physiologically, the biggest feature of the elderly in operating products is the decline in perceptual ability caused by age. For example, the clarity of the interface, the size of the font, the location arrangement of various buttons and the design of rotation or pressing should all be close to the characteristics of the elderly. In ergonomics, we should give full consideration to the application of ergonomics in the development and design of products for the elderly. Designers should establish a corresponding database when collecting and analyzing the basic body size, health status, personality characteristics, consumption psychology, use characteristics, life preferences, activity time allocation, family space utilization, etc. of the elderly. Take comprehensive factors into account in product design.

The key point of ergonomic barrier-free lift-up seat design is to help the elderly to give enough torque to their knee joints in the process of standing, and to assist the elderly to successfully complete the actions of sitting and standing. Setting up the functional module of booster seat design is to create a combination of user's actual needs and corresponding product function design ideas in each independent way, that is, to create each corresponding product single function idea from each user's use requirements. After the matrix diagram of ergonomic barrier-free lift-up seat design is completed, it can not only further study the user's optimal use of the product, but also accurately complete the best scheme of the product.

Old people's body functions are weakened, and their eyesight, hearing and taste are reduced. They also often suffer from symptoms such as osteoporosis, cardiovascular diseases and diabetes. According to the characteristics of diseases, it is an important aspect of design development in the future to design suitable products or personal belongings for the elderly with different health conditions. The designed products should be able to take care of the elderly emotionally, be safe, easy to use and interesting, and help to dispel the bad emotions that the elderly may have because of their poor health. Compared with young people, the elderly prefer a quiet and peaceful environment, so designers should pay more attention to the excitement, brightness and bright colors of products when designing products. The psychological characteristics of the elderly should be fully considered when designing the warning sound and various prompting sounds of the products.

4. Conclusions

With the increasing age, the physical function of the elderly gradually weakens, and the demand for barrier-free products for the elderly also increases. Therefore, the products developed by product designers using the concept of caring design are favored by the elderly and meet the requirements for barrier-free use of products. Designing a product that meets the needs of the elderly can not only bring more economic benefits to enterprises, but also help the elderly to improve their social status and gain more self-confidence. Paying attention to the design of products for the elderly will be a trend and an opportunity. In the field of product design, it is particularly important to grasp and apply the principles of industrial design of products for the elderly.

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