Research on Innovative Development Model of Plant Maintenance Product Design

Xue Li[1], Yuanyuan Chen[2]

[1]Wuhan Business University, Wuhan, Hubei, 430056, China

[2]Lishui university, Lishui, 323000, China

Keywords: Plant Conservation; Product Design; Innovation

Abstract: The rapid development of China's current economy and the improvement of material living standards have triggered a series of severe environmental and social problems. Faced with this situation, designing a modern plant maintenance product that can satisfy the user's emotional experience has become a research topic with certain practical significance and value. The status of plant conservation products was studied from the role of plants and the growing environment. Starting from the humanized design concept, the research on modern plant maintenance products, using ergonomics, interaction design, emotional design and other theories to carry out innovative design and development model research on modern plant maintenance products. This design can enhance the user experience and meet the needs of users for plant maintenance.

1. Introduction

With the continuous development of social and economic development and the continuous improvement of living standards, people have not been satisfied with food and clothing, and began to develop their own preferences and spiritual pursuits [1]. There are many people who choose to raise plants indoors as a way to relax. Indoor planting of green plants not only beautifies the environment, helps to purify the air, but also helps the body and mind to be healthy and relaxed [2]. However, modern urban people are busy working. Although they are willing to plant plants at home, they can't find much time to learn how to maintain plants [3]. Traditional planting methods have certain drawbacks, such as watering and fertilizing, which can easily stain the ground and heavy flower pots. It is not easy to handle, the number of plant varieties is limited, the cultivation and maintenance are time-consuming and laborious, and the plant growth is heavily dependent on natural conditions and is not easy to grow well in indoor environments [4]. According to the survey results, 50% of people who do not raise plants indoors are not raised or afraid of poor maintenance [5].

The current social development trend in China is a gradual transition from an economic society to an information-based society. Therefore, in the product design, special attention is paid to the design concept of “people-oriented” and “everything is human”. The product design is ultimately aimed at satisfying people's needs and serving people. If the products designed and developed cannot meet the needs of people, they will lose the value of their existence [6]. With the rapid development of science and technology, people have begun to enter the network and digital intelligent society, so the quality requirements for the living and working environment are also constantly improving [7]. In the general trend of this development, domestic design circles and enterprises are paying more and more attention to the application of humanized design in the industry [8]. In order to change the drawbacks of using traditional flower pots to plant plants and help urban people to better maintain plants, modern plant maintenance products not only need to improve the functions as flower pots, but also understand the psychological and emotional needs of users to carry out innovative design [9]. Thereby improving the living standards of modern urbanites. By helping users better maintain plants, users can enjoy the fun of planting plants, and understand the difficulty of planting plants, which ultimately evokes people's awareness of environmental protection [10].

  DOI: 10.25236/apssh.2019.046

2. Status of Plant Maintenance Products

2.1. The role of plants

Most people in modern cities spend most of their time indoors, because the busy work and study and the accelerated pace of life lead to less opportunities for urbanites to get in touch with nature. Due to the fast pace of urban life, there is no time or less time for indoor sanitation, which has led to indoor air pollution caused by indoor bacteria. Plants have the function of purifying air, which can achieve the purpose of reducing pollutants through continuous purification of pollutants. According to some related reports, green plants have the ability to adsorb harmful gases in the air, and can absorb, degrade or metabolize toxic gases such as formaldehyde, ammonia, and benzene into water and carbon dioxide.

2.2. Characteristics of plant growth environment

The indoor environment is a relatively closed space system relative to the outdoor environment, so it can effectively avoid the harm of external harmful gases to plants; in addition, the indoor temperature is small compared with the external temperature, which is beneficial to plant growth. However, in addition to temperature requirements, plant growth requires lighting, humidity, etc. Different types of plants have different requirements for temperature, light, humidity, and soil.

2.3. Analysis of the current status of plant maintenance products design

Modern urban people are keen to plant ornamental plants indoors, and they also like to grow green vegetables indoors. This situation has led to a blurred positioning of many plant maintenance products on the market, both for planting ornamental plants and for growing green vegetables indoors. The volume of the basin required to grow green vegetables is larger as shown in Figure 2. The plant maintenance products and traditional flower pots that appear on the market today have no clear population positioning. Modern plant maintenance products based on innovative development models, because of the interaction with the smartphone app, the users of the positioning are mainly the urban population who will operate the smart phone. In summary, the human plant design of modern plant maintenance products is aimed at small ornamental plants, and the use population is an urban population that uses smart phones. It is clearly positioned compared with other plant conservation platforms and traditional flowerpots.

Fig.1. Plant maintenance platform

3. Analysis of innovative Design of Modern Plant Maintenance Products

3.1. From the aspect of design

Apple's product design has always been based on rational streamlined lines and minimalism as a design style, combining the modern minimalist aesthetic experience with the existentialism of

modern aesthetics. This high-tech and simple design has won the height of the urban population. Affirmation and love. Modern plant care products are also smart pots with a high-tech feel. By referring to the shape of the traditional flower pot, and considering that the modern plant maintenance product is a high-tech smart flower pot, the aesthetic of the urban crowd, the shape of the flower pot should be coordinated with the mainstream style of modern interior design, so the choice of the basin is Round, the shape of the box is a streamlined Admiralty type flower pot. Other shapes such as rectangles, squares, etc. are not streamlined, and the shape of the chrysanthemum or flower basket is too complicated and not simple. The flower bed in the shape of a golden bell is the best choice for modern plant maintenance products.

Fig.2. Golden bell pot

3.2. From the aspect of structural shaping

The structural design of modern plant maintenance products is an important factor that can not be ignored in product design. Good structural design can not only be convenient for users, but also can improve the user's psychological and emotional experience. It can be seen that structural design is very important. Considering that modern plant maintenance products are mainly used by urban people who have fast pace of life and busy work, from the perspective of structural design, the design of plant maintenance platform should be light and compact, and suitable for urban people to place in small living rooms. And moving, on the other hand, meet the requirements of the cultivation environment of small ornamental plants. In addition, the modern plant maintenance product is a smart flower pot that can be controlled by the app to automatically water it. In order to facilitate the user's use, the loss of the flower pot during use is reduced. Therefore, the structure of the two-layer flower pot is designed, and the inner pot can be conveniently The user takes out the soil, plantes the plant, and then puts the planted inner pot into the outer pot. The built-in sensor of the outer pot structure detects the real-time growth state of the plant and transmits it to the user's mobile phone app, so that the user can pay attention to it at any time. Plant growth status.

3.3. From the aspect of material selection

The material of the flower pot is various, including FRP flower pots, stone flower pots, sandstone flower pots, glazed pottery pots, water basins, porcelain pots, plastic pots, purple pots and so on. The glass flowerpot has beautiful appearance and corrosion resistance, and is mainly used for cultivating hydroponic plants; the purple sand pot has good air permeability and excellent production, and is suitable for planting plants that prefer a moist environment; the stone flower pot is a flower pot made of natural stone, and its color is bright but It is not too cumbersome to put on the table; the tile basin is cheap, the specifications are complete, the gas permeability is good, but the quality is heavier, and because the pot wall is thicker, it is not suitable for making the inner and outer double-layer flower pots. Through the comparison of various materials, plastics were finally

selected as materials for modern plant maintenance products.

Fig.3. ABS plastic

Plastics are materials that are often used in the design of modern industrial products. The main reason is that the plastics have superior production performance, which enables the product to achieve good artistic effects at a lower economic cost, and can be produced on a large scale. The process of plastic products is relatively simple compared to the production process of other materials, and it is easy to obtain products of various shapes, and then further processing and surface treatment can complete the design of the product. The process of plastic processing enables the design of the product to be less restricted, thus fully realizing the product designer's design idea of the product structure and shape. The plastic material has a plastic appearance and a visually comfortable and comfortable texture. It can be made into a transparent, translucent and opaque state as needed, with appropriate elasticity and flexibility, giving a soft and intimate tactile texture. Therefore, plastic is the most suitable material for modern plant maintenance products.

3.4. from the color matching

Color design is one of the important aspects of product design. The use of a reasonable color scheme for product design not only highlights the personality of the product, but also attracts the attention of consumers. Reasonable color matching can improve the grade and competitiveness of the products, and bring people a visual aesthetic and spiritual enjoyment. Each color has its own personality and characteristics, which can bring different visual experiences and psychological experiences. For example, the more striking colors such as yellow, red, and orange can give people a sense of excitement. Blue will give people a feeling of depression. Green will reminiscent of nature and give people a sense of calmness. People feel depressed in high-purity environments such as black and white, and they feel quiet and comfortable in a low-purity color environment such as a gray environment. The dark colors are heavy in visual and psychological sense, and the bright colors feel light. In the product design, the upper part of the product is made of a striking color. The use of a darker color makes the person feel stable. If the character of the product is avant-garde and changes, try the dark color on the top and the bright color on the lower part to make the whole product look vibrant.

4. Innovative Development Model for Plant Maintenance Product Design

4.1. Meet user expectations

In the process of interaction design, because different levels of users have different expectations for design objects, different requirements arise. Designers need to solve different problems according to these requirements to complete the analysis of design objects. Therefore, the preliminary research and analysis of positioning user groups, in order to understand the expectations of different levels of users has great practical significance for the completion of interaction design.

According to Maslow's hierarchy of needs, people's satisfaction with requirements always follows the order from low to high. Therefore, in the interactive design process, the primary task of product design is to ensure the good realization of product functions. Base in a well-functioning implementation

Based on the interaction design, the use process is more user-friendly. When the user approves the function of the product, the product is further. Added value, allowing users to further enjoy a pleasant experience during use.

4.2. In line with the user's behavior

When users come into contact with new products, they are sometimes in a passive state and need to change their habits and cognitions to adapt to new forms and functions. To put it another way, if the functional design of the product can better conform to the user's behavior habits, the usability of the interaction design and the subjective initiative of the user can be enhanced. The correct grasp and cognition of user behavior habits can make it easier to create the interaction between users and products, enhance the user's subjective initiative and control, and establish a good experience and trust of users.

The target group of modern plant maintenance products is mainly the use of smart phones, the modern urban people who are usually busy with work and study. Their time is completely occupied by busy work, schoolwork and life. There is no time and energy to learn complicated operation process. Plant conservation. Therefore, the functional design of modern plant maintenance products should be easy to learn and operate. The operation process of the mobile app should conform to the user's cognition and the operation habits of the software, thus establishing an interactive relationship with the user and enhancing the subjective initiative of the user. Control feeling.

4.3. Favorable interactive environment

The interactive environment refers to the physical environment in which the interaction between people and products occurs, including the medium of interaction, the space for interaction and other related facilities. The interactive environment needs to be divided according to the positioning population, and different people have different interaction environments. For example, the interactive environment of the elderly using products is different from the requirements of young people, so in the interaction design, a favorable interactive environment should be created according to the characteristics of the positioning population. Modern plant maintenance products are targeted at urban people, and urban people's activities are mainly indoors such as bedrooms, kitchens, restaurants, and offices. According to the use environment of the target group, the interaction space between the modern plant maintenance products and the users is mainly carried out indoors. At the same time, modern plant care products are an electronic product that reduces the service life of modern plant care products if exposed to wind, rain or exposure in an open environment. From this perspective, the living environment of urban people can meet the interactive communication space requirements of modern plant maintenance products. In addition, the interaction between the modern plant maintenance product and the user is to receive the plant growth information fed back by the modern plant maintenance product through the mobile phone app as a medium, so the user needs to use the smart phone, and the interaction process of the modern plant maintenance product can be completed.

According to the urban population and product characteristics, the interactive communication space is determined, and it is confirmed that the smart phone can be used as the interactive medium of the product. In such an advantageous interaction environment, the interaction process between the modern plant maintenance product and the user can be successfully performed.

5. Conclusion

Based on the continuous improvement of social and economic development and the continuous improvement of people's living standards, urban people began to cultivate green plants as their own preferences and spiritual pursuits, but they did not know how to maintain good plants due to busy

work and schoolwork. In the social context, the humanized design research of modern plant maintenance products came into being. This paper mainly discusses the application of humanized design in current plant maintenance products, and summarizes the connotation of humanized design. It mainly proposes the humanity of modern plant maintenance products from three aspects: using ergonomics, improving interaction design and satisfying emotional needs the method of design. Through the reading and sorting of a large amount of literature, the investigation of the existing flowerpot market and the questionnaire survey of the smart flowerpot market, the design goals and directions of modern plant maintenance products are summarized, and the importance of humanized design of modern plant maintenance products is highlighted for further reference and further development of smart flowerpots.

Acknowledgement

In this paper, the research was sponsored by the achievements of Wuhan Business University's scientific research project" Development and design of virtual reality system for flower cultivation"(Project Approval Number: Wuhan Business University[2018]48+2018KY016)

References

[1] Manole-Paunescu A. Biotechnology for Endangered Plant Conservation. Romanian Biotechnological Letters, 2014, 14(1):4095-4103.

[2] Guerrant E O, Havens K, Vitt P. Sampling for Effective Ex Situ Plant Conservation. International Journal of Plant Sciences, 2014, 175(1):11-20.

[3] Griffith M P, Francisco-Ortega J, Cibrian-Jaramillo A. Special Issue on Genetics and Plant Conservation in Latin America. Botanical Review, 2013, 79(4):447-448.

[4] Muñozrodríguez P, Munt D D, Saiz J C M. Global strategy for plant conservation: inadequate in situ conservation of threatened flora in Spain. Israel Journal of Plant Sciences, 2016, 63(4):1-12.

[5] Joppa L N, Visconti P, Jenkins C N. Achieving the Convention on Biological Diversity's Goals for Plant Conservation. Science, 2013, 341(6150):1100-1103.

[6] Graziano R, Simone O, Chiara M. Is legal protection sufficient to ensure plant conservation? The Italian Red List of policy species as a case study. Oryx, 2016, 50(3):431-436.

[7] Romeiras M M, Catarino S, Gomes I. IUCN Red List assessment of the Cape Verde endemic flora: towards a global strategy for plant conservation in Macaronesia. Botanical Journal of the Linnean Society, 2016, 180(3):413-425.

[8] Guja L K, Broadhurst L M, Brown A H D. Genetic diversity is a significant but not the only consideration for effective ex situ plant conservation: Response to Hoban and Schlarbaum. Biological Conservation, 2015, 184(3):467-468.

[9] Pence V C. In Vitro Methods and the Challenge of Exceptional Species for Target 8 of the Global Strategy for Plant Conservation 1. Annals of the Missouri Botanical Garden, 2013, 99(2):214-220.

[10] Negrón-Ortiz V. Pattern of expenditures for plant conservation under the Endangered Species Act. Biological Conservation, 2014, 171(1):36-43.