

Research on Designing Emotional Companion Devices to Enhance Elderly Well-being and Alleviate Loneliness

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Abstract: *Background:* As society ages, the number of elderly people in China increases, resulting in an increasing demand for elderly products in the market. Additionally, the emotional needs of elderly people are becoming more essential. Traditional family structures and social support are insufficient to meet all their needs, especially when it comes to emotional connection. *Objective:* Considering the frequent experience of loneliness, and fear of electronic devices among the elderly, as well as the need for emotional integration between the elderly and younger generations, designing a multi-functional and easy to use emotional experience product for the elderly may be very useful in addressing these issues. *Methods:* The product design of emotional experience for the elderly should fully consider the special needs of the elderly, including ease of use, entertainment, practicality and so on. The design should adopt a simple and intuitive appearance, large buttons and easy-to-operate controls, voice and touch interaction methods, and provide remote communication and reminder functions. Ensure that the elderly can easily use the product and have a positive emotional experience from it. In addition, entertainment elements can also be incorporated, such as radio, playing music and other functionalities. *Results:* Through the above measures, the elderly companion machine can serve multiple functions, effectively alleviating the loneliness experience by elderly individuals. Furthermore, it provide convenience and warmth, making it a good companion for the elderly. *Conclusions:* 1. The market for products targeting the elderly is in the stage of rapid growth, with broad development prospects and huge market potential. 2. Research on emotional companion machines for the elderly has important social significance and application value. 3. Through the realization of technology and the exploration of application scenarios, we can provide more comprehensive and personalized emotional companionship services for the elderly to improve their quality of life and happiness. 4. At the same time, it is important to address additional issues arising from technological advancements to ensure that the research and development and application of emotional companionship machines can truly benefit the elderly and promote their well-being.

Keywords: Products for the aged; Emotional needs; Ease of use; To accompany; Happiness

1. Introduction

1.1 Research Background

As society ages, the number of elderly people in China continues to rise, accounting for a higher proportion of the population being comprised of older adults. In 2010, the elderly population (≥ 65 years old) accounted for 8.9% of the total population. In 2011, the proportion reached 9.1%, while in 2012 the percentage was 9.4%. China has about 24 million elderly people over the age of 80 and approximately 40 million disabled or semi-disabled elderly people by the end of 2014.

The seventh national census conducted on May 11, 2021, shows a significant increase in the aging population. According to network data, China's population aged 65 and above increased from 26.32 million in 1953 to 200 million in 2021, accounting for

4.4% to 14.2% of the total population. China's population is currently experiencing an elevated rate of aging, which ranks it among the upper middle level in the world.

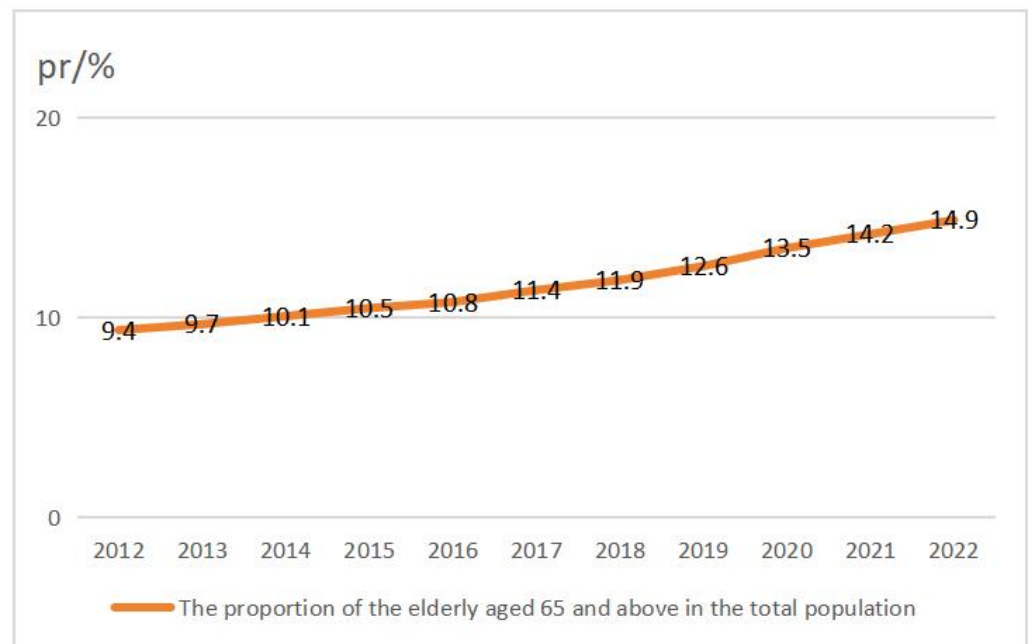


Figure 1: The proportion of the elderly aged 65 and above in the total population of China from 2012 to 2022

The demographic features of China's aging population show that it will remain at a consistently high level for an extended period of time, forming a "plateau" rather than a "peak" trend. This means that China will experience a prolonged period of advanced aging. (Peng, 2024). With the increase in the aging trend in the country, there has been a gradual rise in the need for products specifically designed for middle and old-age individuals. Additionally, with the continuous increase of elderly people in the global population, there is a growing concern for the quality of life and the emotional needs of this population group.

Data show that the United States experiences a slower aging process compared with China and Japan. It takes 65 years for the United States to reach a state of advanced aging, while China and Japan are only 25 years and 24 years respectively. High fertility rates and permissive immigration policies have slowed America's aging rate. The United States is among the countries that have seen early population aging. Over more than 70 years, the aging industry in the country has entered a rational development stage, driven by private investment, market-oriented operations, government support, and supervision. The elderly consumer industry in the United States is well-established, and the Japanese culture and entertainment industry for the elderly also benefits from its expertise. The growth of elderly consumer demand and capital accumulation have led to the creation of many innovative products and services. These developments are of great significance for the advancement of China's aging industry.

At present, China's aging industry is still in its early stages. From the perspective of policy guidance, population structure, consumption power, and business model, the aging industry is still in its early stage of development, with a large market and huge potential (Cheng, 2022). China's elderly population, especially the elderly over 80 years old and disabled elderly are experiencing rapid growth of 1 million annually. The development of elderly products is still far behind compared with the speed of population aging. The current market for elderly products is monotonous, with few varieties, mostly focused on health care and medical products. There are very few products specifically designed for the elderly, including those related to life, entertainment, and transportation. The shortage of such unique products hinders the elderly from achieving a satisfactory buying experience.

1.2 Research Purpose

As the process of aging becomes more apparent, it is necessary to conduct a study and design products specifically tailored for the aged. The physical and mental health status of the elderly changes, the number of children decreases, and there is an increasing demand for life care and spiritual comfort (Liu, 2013). The material needs of the elderly are basically satisfied, hence emotional support becomes their most important concern (Li, 2016). In today's market, although there are bright spots in the design of elderly products, there is insufficient attention to their emotional needs, resulting in a lack of implementation of what the market can offer. Therefore, it has become an urgent need to integrate emotional design for innovation, which helps to create high-quality products for the elderly and enrich and improve their quality of life. (Wang, 2023) It is of great practical significance and social value to study emotional companionship products for the elderly, explore their technical implementation and application scenarios, and provide care and convenience to the large population of elderly people.

1.3 Research Contents

According to the current situation analysis and literature research on the development of elderly products, the market for such items should cover several areas, including daily life, health care, leisure, and entertainment. Improving the quality of life during old age requires self-regulation, family care, social help, and appropriate products. Therefore, prioritizing the elderly and fully considering their physiological and psychological changes is the fundamental requirement of creating suitable products for the elderly population (Wang, 2021). In addition, senior products should focus on practicality and comfort to meet the various needs of the elderly in their daily lives. With the rapid development of intelligent technology, an increasing number of elderly products have begun to integrate smart features. The emergence of smart wearable devices, smart homes, smart health monitoring, and other products provides a better and more convenient life experience for the elderly. Through the application of advanced technology, products designed for the elderly can better address their health, safety, and entertainment needs and improve their well-being. Overall, the elderly product market has broad development prospects and huge market potential. Due to the increasing trend of aging and the continuous progress of science and technology, the market for elderly products will continue to maintain a rapid growth rate. In the future, elderly products will pay more attention to the development of intelligence, personalization, and customization to meet the diversified and complex needs of elderly individuals. At the same time, as society pays more attention to the quality of life of the elderly, the market for products responding to their needs is expected to become an important sector with huge commercial and social value. In terms of user scenarios, emotional companionship scenarios are examined, particularly when the elderly feel lonely at home or miss their loved ones. Product experience: Use smart home devices, such as smart speakers, to provide voice chat, play music, tell stories, and other functions for the elderly to simulate the feeling of accompanying relatives and alleviate loneliness. In the context of social interaction scenarios, the elderly want to keep in touch with their peers or relatives and share their life stories. In terms of product experience, social media applications or online communication platforms suitable for the elderly can be developed to provide a simple and easy-to-use interface and a wide range of social functions. This will enable the elderly to easily engage in social interaction and enhance emotional connection.

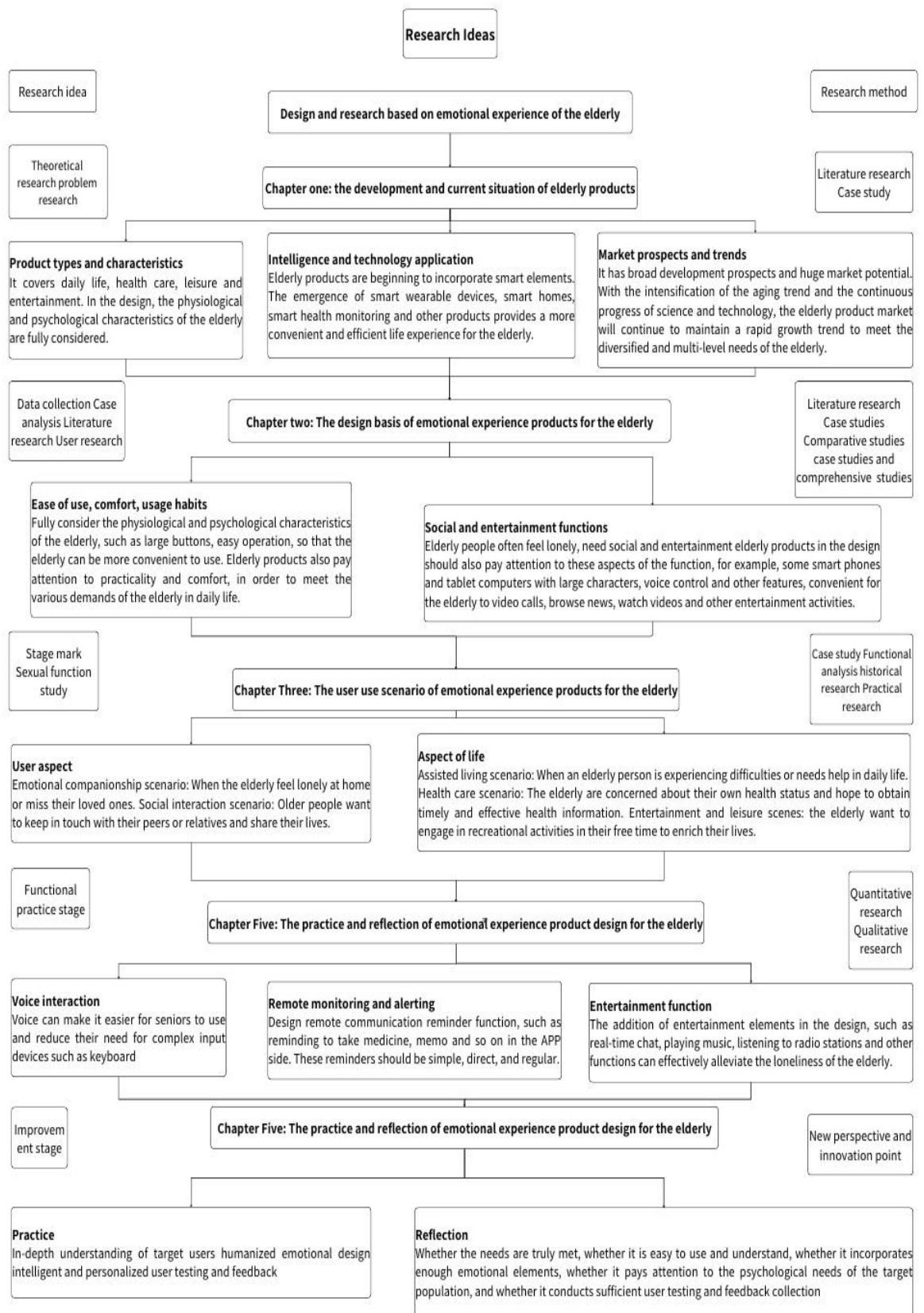


Figure 2: Research roadmap

1.4 Research Methods

This study uses the literature research method to summarize and analyze the relevant literature on the current situation of the elderly, products designed for the elderly, and their psychological and emotional health. The aim is to establish clear definitions for core concepts and relevant theories, as well as summarize the existing research content and findings. Then, the survey method is used to obtain the feedback and opinions of the elderly through questionnaires, user interviews, and other ways to study the needs of the elderly and understand their needs and habits. Before product design, it is necessary to understand the situation of similar products in the market and market demand through market research, competitive product analysis, and other ways to study the market demand. Based on the results from the initial two stages of research, a preliminary product prototype is created. Product models can be made by hand painting or 3D printing for testing and enhancement. After that, the designed prototype will be presented to the elderly for testing, collecting their feedback and opinions, and evaluating the product's stability and ease of use. Finally, based on the outcomes of user testing, the product has been enhanced and optimized, and ongoing efforts are being made to improve it further.

2. Literature Review

Based on the literature and research on product design for the emotional experience of the elderly, available on CNKNO.cn, it is evident that in the 21st century, China's living standards have improved, and the consumption power of the elderly has also increased. However, the elderly industry remains underdeveloped, and there is a lack of products that adequately meet their needs (Wang, 2006). The availability of elderly supplies is limited in the early stages of aging, focused primarily on physiological needs, while emotional needs are often disregarded (Wang, 2009). Subsequently, designers began to pay attention to the emotional experience of the elderly, giving priority to emotional function (Bai, 2010). The acceleration of the aging process promotes the development of the elderly industry, leading to a new era in the market for products focusing on the elderly (Li, 2014). In recent years, population aging has become a prominent social problem, leading to increased focus on the design of products for the elderly (Shan, 2018). Designers have mastered more design principles specifically tailored for the elderly. These concepts include safety, functional rationality, ease of use, emotion, personalization, and intelligence.



Figure 3: Literature analysis timeline

After searching relevant papers and journals on emotional experience design for the elderly using Google Academic, it has been learned that the research direction in this field can be extensively explored from various perspectives. The following is a clear summary of the research direction according to the information provided by the reference articles. These research directions together constitute a comprehensive exploration and development of products that enhance the emotional experience of the elderly. Through the analysis of these characteristics, in-depth research and practical application can be carried out. Furthermore, in the actual research, the method must be

flexible and may make some adjustments and improvements to adapt to the characteristics and needs of the elderly. Designing products that better meet the emotional needs of the elderly to improve their quality of life and happiness.

Table 1: Summary of Literature Features

Research Direction	Reference	Trait
Emotional characteristics and needs analysis	Designing Products for Older People' s Social and Emotional Needs: A Case Study(White, 2022) Empowering Elderly Emotion Wellness using Cultural Kansei Robotic Interaction Design (Bidin, 2018)	A theoretical framework is proposed to support designers in considering social and emotional connections when designing household products for the elderly, and the importance of considering practical meanings and requirements in design is emphasized.
User experience and product design	Theoretical Model of Special Product Design for the Elderly (Zheng, 2016) Design Elements: The Interaction of Elderly People on Product Interfaces (Siran, 2018)	The theoretical model of product design for the elderly is studied, and the influencing factors are expounded. Compare and analyze the similarities and differences between special product design and barrier-free and universal design; Its concept, nature and characteristics are summarized. The basic principles of function, form, ergonomics, structure and value of product design for the elderly are summarized.
Humanistic care and psychological adjustment	Research on Kansei Engineering System Establishment for Elderly Product Design (Shi, 2019) Involving the Elderly in the Design Process: A Participatory Design Model for Usability, Safety and Attractiveness (Demirbilek, 1999)	The multi-dimensional characteristics such as consciousness, personality and aesthetics of the elderly are studied. Through interviews and questionnaires, we can deeply understand their physiological and psychological characteristics, lifestyle and supply environment. Experiments measure psychological preferences, identify design elements, and establish new design patterns that conform to their psychological preferences. In the pursuit of quality at the same time, pay more attention to the perceptual preferences of elderly users.
Research method and technology application	Designing mobile technology for the elderly. A theoretical overview (Iancu, 2020) Value-based design for the elderly: An application in the field of mobility aids (Boerema, 2017) Interaction Design of Products for the Elderly in Smart Home Under the Mode of Medical Care and Pension (Yang, 2016)	Although the development of assistive technology is remarkable, the lack of ease of use frustrates the elderly. Aging health and smart technology do not match, and capability degradation limits the smart home experience. It is urgent to study and improve the interactive design of smart homes for the elderly, explore the contradiction with the needs of elderly life, and analyze the product case.

3. Theoretical Analysis of Emotional Experience Design

3.1 Concept of Emotional Experience Design

Emotion refers to the psychological response individuals have toward their perception of external objects in real-world situations, and these responses vary among individuals (Li, 2022). In Donna A. Norman's book "Psychology of Design 3- Emotional Design", emotional design is defined as a type of design that aims to capture the user's attention and induce an emotional response in order to increase the likelihood of performing a specific action. Generally speaking, the design aims to stimulate emotional responses from users. Emotional experience refers to the method by which the product's shape, color, function, and other features enhance users' emotional resonance and aesthetic experience. This allows users to perceive the cultural value incorporated into the product (Xu, 2023) (Teng, 2021). Therefore, emotional experience design is part of emotional design. Emotional experience design should be based on humanization and pay attention to the emotional function and user experience of products while emphasizing the practical functions of products. Greater emphasis should be given to users' emotional experience rather than excessively focusing on rational design and functional aspects of products (Jiang, 2018). Therefore, emotional experience product design should focus on understanding and satisfying the user's emotions during the product usage experience. Emphasize a human-centered, in-depth understanding of their emotional characteristics and needs, as well as enhance the emotional value and user satisfaction of the product.

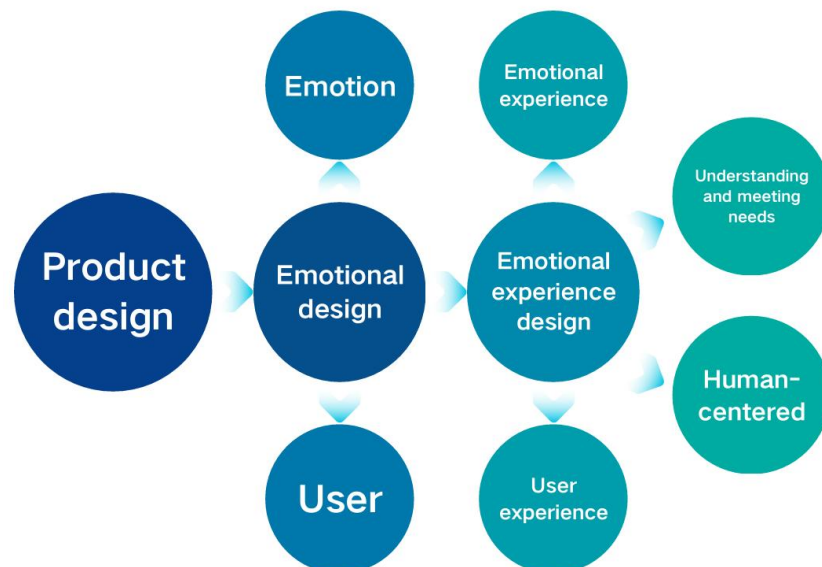


Figure 4: The relationship between emotion, emotional experience and emotional design in product design

3.2 Principles of Emotional Experience Design

1) Principle of ease of use

The key to making product design suitable for the elderly is to simplify design and make it easy to operate. Because older people are less able to accept new things due to physical and cognitive decline. Complex operations increase the difficulty of learning, affect the mentality and self-efficacy, and make it easy to form a negative cycle. Older people are often less familiar with new technology and resistant to electronics. In order not to affect its emotional well-being, the design must be as simple and intuitive as possible. Designers can use elements such as large buttons, simplified icons and clearly distinguishable colors to make it easier for seniors to understand and operate.

2) Security principles

As individuals grow older, they experience a decline in physiological function, motor coordination, and an increased risk of disease. This results in delayed reactions and less mobility, and therefore, they have a high demand for product safety (Lu, 2020). When designing products for the elderly, it is necessary to prioritize safety considerations and eliminate potential hazards. The shape should be rounded to reduce the risk of bumping, and the interaction design should simplify the operation to adapt to the cognitive abilities of the elderly and reduce the physical strain of bending and carrying. In the selection of materials, priority should be given to natural, environmentally friendly, and pollution-free materials (Guo, 2024).

3) The principle of interaction

By including interactive links in the design, the level of interactivity between the elderly and the product is enhanced, leading to an improved sense of participation and satisfaction among the elderly. Utilizing voice engagement, touch interaction, and other methods can help reduce the difficulty of operating devices and improve the efficiency of the elderly. The elderly have the characteristic of having a distinct inclination towards loving companionship, and actively engaging with others, a factor that should be fully considered in product design. The interactive principle of the product should be reflected in its ability to easily connect with their peers and relatives, thus becoming a bridge and channel for the elderly to carry out social and emotional bonds (Zhang, 2023). Through well-designed interactive functions, the product can provide a pleasant and convenient social platform for the elderly.

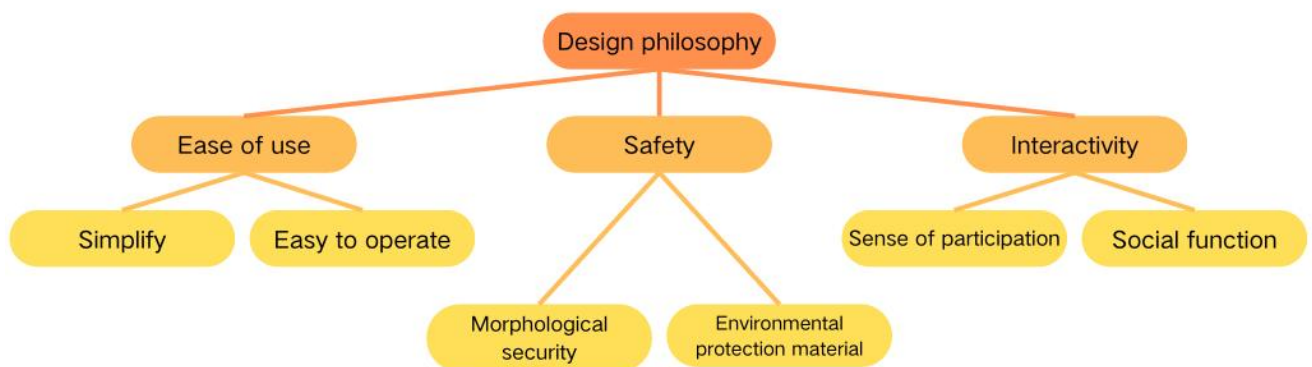


Figure 5: Design principles map

3.3 Emotional Experience Design Method

1) Design method based on user research

The research methodology mainly includes user interviews, observational techniques, questionnaire surveys, etc. Firstly, it conducts in-depth communication with the elderly to understand their living habits, interests, expectations, and areas of discomfort. Analyze the behavioral patterns of older people in their daily routines to identify potential needs and opportunities. After that, the opinions and feedback of the elderly were collected through a questionnaire survey to improve and optimize the product design.

2) Emotional design method

The primary focus is on color and material design, emotional interaction, and other related aspects. Color likely influences the user's psychological feelings. Elderly

individuals prefer color combinations that provide comfort because of their inclination towards stability (Tian, 2023), and they specifically choose warm and soft colors to provide a sense of ease and pleasure. Using materials that are both comfortable and easy to clean will improve the product experience. By utilizing voice prompts, voice interaction, and other methods, we will provide the elderly with a more friendly and natural experience.

(3) Design methods for age-appropriate products

Social interaction products with features such as video calling or voice chat can be designed to help the elderly maintain social contact with relatives and friends, thereby reducing feelings of loneliness. Considering the cognitive decline of the elderly, the design should be intuitive and simple. This involves avoiding complex operation processes and reducing the number of buttons, allowing the elderly to easily learn and quickly master the usage of the product.

4. Practice of Emotional Experience Design for the Elderly

4.1 Case Analysis of Emotional Experience Design for the Elderly

4.1.1. Reminder Tray Case Study



Figure 7: Reminder tray

1) Design background and objectives

As individuals grow older, they experience a decline in memory and vision, which often results in forgetting the location of objects. To solve this problem, designer Gao Yuan has designed an innovative “Reminder tray” to provide a convenient and intelligent storage solution for the elderly.

2) Product characteristics analysis

First, the storage tray divides the storage space into four separate areas, and in each storage area's prominent position, the design has clear and easy-to-understand icons. These icons are associated with the corresponding item, further helping the elderly identify and remember the location of the item. Upon placing the items in the designated storage area, the built-in sensor will activate the corresponding light. This instant feedback mechanism not only informs the seniors that the item has been successfully placed but also enhances their interaction with the product. In consideration of older people's habits and living environment, the reminder tray is made of durable and easy-to-clean materials. This design ensures the product's long-term functionality and sanitary conditions.

3) User experience analysis

The Reminder tray has been designed with clear partitions and icons to significantly improve the ease with which older people can locate and place objects. They don't have to spend much time and energy looking for these frequently used items.

Seniors can accurately place items in the right place due to the implementation of intelligent sensing and feedback mechanisms. This helps to reduce potential risks caused by misplacing or forgetting to place items. The interaction with the elderly through light feedback has enhanced their sense of participation and achievement, helping to improve their quality of life and self-confidence.

4)Design significance and influence

The Reminder tray’s design provides intelligent sensing and lighting reminders to ensure a safe and convenient storage experience, thereby improving the quality of life and demonstrating respect for the needs of older people. This design serves as an inspiration for designers and manufacturers, as it emphasizes the importance of fully considering the special needs of the elderly during the design process to create more humane and intelligent products and services.

5)Analysis of advantages and disadvantages in actual use

Reminder dials through intuitive partitions and icons can reduce learning costs for older people and improve ease of use. The instant light feedback mechanism is especially useful at night or in low-light environments, as it reduces the anxiety that elderly people experience when they forget the location of objects. Disadvantages: Due to its small capacity, it may not be able to accommodate large storage requirements, and needs additional storage space. Relying on electricity, power failure, or forgetting to charge, causes inconvenience to the user. Additionally, its limited mobility restricts its applicability in various rooms or locations. Patient guidance and training may be necessary for the operation and setting, as improper operation may affect the use of the application.

Table2: Reminder tray case characteristics analysis

Characteristic	Keyword	
Product feature	Use icon identification, intelligent sensing and feedback, durable and easy to clean	
UE(user experience)	Convenience, security, interactivity	
Merit and demerit	Advantages: intuitive and easy to use design, intelligent sensing and feedback, enhance life confidence	Disadvantages: Limited capacity, dependent on electricity, not with mobility, operation Settings need guidance

4.1.2. Case Study of DDSTUDIO Walking Assistance Vehicle (PAT)



Figure 7: DDSTUDIO Walking Assistance Vehicle (PAT)

1)Design background and objectives

Many older adults experience mobility problems that limit their range of daily activities and negatively impact their quality of life. In response to this need, DDSTUDIO has designed a Walking Assistance vehicle (PAT) that aims to help elderly people overcome walking difficulties through user-friendly design and encourage them to get out of the house and enjoy more outdoor activities.

2)Product characteristics analysis

PAT is made of carbon fiber material, a material known for its lightweight and strong properties. This ensures the durability of walking assistance vehicle while also reducing the burden on elderly users. The walker features an elegant design that eliminates the psychological strain associated with traditional walkers. It is lightweight and easy to carry and control, thus, enhancing user confidence. PAT provides reliable support, an auxiliary walking function, and a certain carrying capacity, convenient for carrying everyday necessities. At the same time, considering different heights and body types, adjustable armrests and seats are provided to meet the needs of different users.

3)User experience analysis

PAT's lightweight design and adjustable armrests and seats make it easy for the elderly to learn how to use them quickly. At the same time, the elderly's safety and stability are greatly enhanced by the stable support and assisted walking function. The lightweight nature of the carbon fiber material allows PAT to provide stable support without overburdening the elderly. The adjustable armrests and seats ensure the comfort of the elderly during use. PAT's elegant shape and humanized design not only solve the problem of mobility inconvenience but also bring them psychological satisfaction and self-confidence. This makes the elderly more willing to use PAT for outdoor activities and enjoy more fun in life.

4)Design significance and influence

The Walking Assistance Vehicle (PAT) was designed by DDSTUDIO as a practical product that also demonstrates concern and respect for the quality of life of the elderly. It solves the mobility problem of the elderly through user-friendly design which encourages them to engage in more outdoor activities and leave the house. At the same time, PAT's design also reflects the attention to the psychological needs of the elderly, which provides them with more psychological satisfaction and self-confidence. The successful design of this product not only brings good news to the elderly but also serves as a useful inspiration for other designers and manufacturers. Specifically, the special needs and psychological needs of users should be fully considered during the product design process, in order to provide more humanized and practical products and services.

5)Advantages and disadvantages in actual use

Advantages: The carbon fiber material makes the PAT light and strong, and easy for the elderly to carry and use. Wide support feet and non-slip pads ensure stability during walking. In addition to assisting with walking, it also has a certain carrying capacity, which is convenient for the elderly to carry daily supplies. **Disadvantages:** Due to the use of high-quality carbon fiber materials and other advanced designs, the price of PAT can be relatively high and not all seniors can afford it. While PAT is designed with a focus on ease of use, it may require some learning and adaptation for some older or less physically able seniors.

Table 3: DDSTUDIO Walking Assistance Vehicle characteristics analysis

Characteristic	Keyword
Product feature	Good material selection, humanized design, functional practicability

UE (user experience)	Ease of use, comfort, psychological satisfaction	
Merit and demerit	Advantages: Light and strong, strong stability, versatility	Disadvantages: high price, high technical threshold

4.1.3 Atlas Companion Furniture Design Case Analysis



Figure 8:Atlas companion furniture design

1) Design background and objectives

With the rapid development of society and the change in population structure, the phenomenon of empty nesters has gradually become prominent. These elderly people may not be lacking in material life, but they often face the spiritual dilemma of loneliness and lack of companionship. In response to this problem, Atlas companion furniture design came into existence. Its original intention is to create a warm and companionable home environment for these elderly people through anthropomorphic elements and interactive ways.

2) Analysis of design characteristics

The most notable feature of Atlas furniture design is anthropomorphism. By giving the furniture a human image and characteristics, such as warm colors, soft lines, and even the ability to make sounds or simple interactions, furniture is no longer a cold object but becomes an intimate companion of the elderly. Atlas furniture emphasizes comfort. The use of soft, environmentally friendly materials to ensure the comfort and safety of the elderly; At the same time, the dimensions and angles of the furniture have also been carefully designed to meet the physiological characteristics and use habits of the elderly.

3) User experience analysis

The anthropomorphic design of Atlas companion furniture enhances the companionship and interaction of furniture, allowing the elderly to feel the warmth and companionship of home while using the furniture, thereby enhancing their emotional satisfaction. The comfort of furniture is particularly important for the elderly. Atlas companion furniture design focuses on ergonomic principles to ensure that the elderly feel comfortable and relaxed while using the furniture providing correct support and sitting posture. Additionally, the smooth lines of furniture, harmonious color matching, and the overall home style coordination enhance the beauty of the home. This aesthetics not only allows the elderly to be visually satisfied but also increases their happiness.

4) Design significance and influence

Atlas companion furniture design not only provides a warm and inviting home environment for empty nesters but also introduces new ideas and inspiration to the field of furniture design. It breaks the single-function limitation of traditional furniture and elevates the relationship between furniture and people to a new height. At the same time, it also reminds us to pay attention to the mental health and quality of life of the elderly.

5)Advantages and disadvantages in actual use

Advantages: The core concept of Atlas companion furniture design is to provide a warm environment for the home, especially the empty nesters, through anthropomorphism as a design tool. This design helps to reduce the loneliness of the elderly and increase their psychological comfort. The anthropomorphic design of furniture may contain more humane elements, such as comfortable sitting position, easy-to-operate interface, etc., which can enhance the user experience of the elderly.

Table4:Atlas companion furniture design case characteristics analysis

Characteristic	Keyword	
Product feature	Anthropomorphic design, comfort	
UE(user experience)	Emotional satisfaction, comfort, relaxation, happiness	
Merit and demerit	Advantages: Increase comfort, humanized design	Disadvantages: The price may be high, cannot meet everyone's needs

4.2 Relationship Between Emotional Experience Design and Quality of Life of the Elderly

1) The importance of emotional experience design in products for the elderly

According to the World Health Organization (WHO), 15% of healthy longevity is genetic, 25% is influenced by society, medicine, and climate, and 60% is determined by personal physical and mental health, lifestyle, and diet. Although genetics is not optional, other factors can be prevented. Psychological factors are important mediums of health effects, which can amplify or buffer social events. The influence of subjective factors (55%) on the mental health of the elderly was much greater than that of objective factors (21%) and demographic variables (24%). The primary factor in adjusting mental health is a subjective attitude, and the regulation of positive emotions is an important step to achieving healthy aging. (Zhang, 2013)



Figure 8: The proportion of factors in the health and longevity of the elderly and the proportion of factors in the mental health of the elderly

The idea of emotional experience design is to address the psychological and emotional needs of the elderly to enable them to actively self-regulate. Its design goal is to make users feel happy, satisfied, and concerned as they use the product, through the different emotional experiences brought by the product (Li, 2023). In the design of products for the elderly, this means that it is necessary to deeply understand the living habits, interests, and psychological needs of the elderly, so as to design products that can arouse their emotional resonance. Emotional experience design emphasizes the emotional communication and interaction between products and users. For the elderly,

this interactivity can help them better understand and use products, while enhancing their sense of social engagement and self-worth. Emotional experience design pursues emotional design elements and ways of expression so that the elderly can obtain positive emotional experiences such as pleasure and satisfaction when using products. This helps to improve the quality of life of older people and enhance their sense of well-being.

2) The impact of emotional experience design on the quality of life of the elderly

The network data survey indicates that the negative emotions of the elderly are becoming apparent as they age, as well as the mental and emotional changes accompanying them. In the economic conditions of the elderly outpatient group, 48% of people suffer from depression, and 44% of those with depression symptoms are in better physical health and economic conditions, accounting for almost half of the population. Good emotional experience design can stimulate the positive emotions of the elderly, thus regulating their physiological function, enhancing immunity, and promoting physical recovery. For example, some fitness equipment and rehabilitation equipment help the elderly maintain a pleasant mood during exercise and improve exercise results by providing a fun and interactive experience. By meeting the psychological needs of the elderly, they can enhance their psychological resilience and improve their ability to cope with pressure. For the elderly, this psychological support can help alleviate negative emotions such as loneliness and anxiety and improve their mental health. Some can stimulate the social interests of the elderly and enhance their interaction and communication with others. For example, some smart home products help the elderly keep in touch with relatives and friends and expand their social circle by providing remote video calls, online social networking, and other functions.

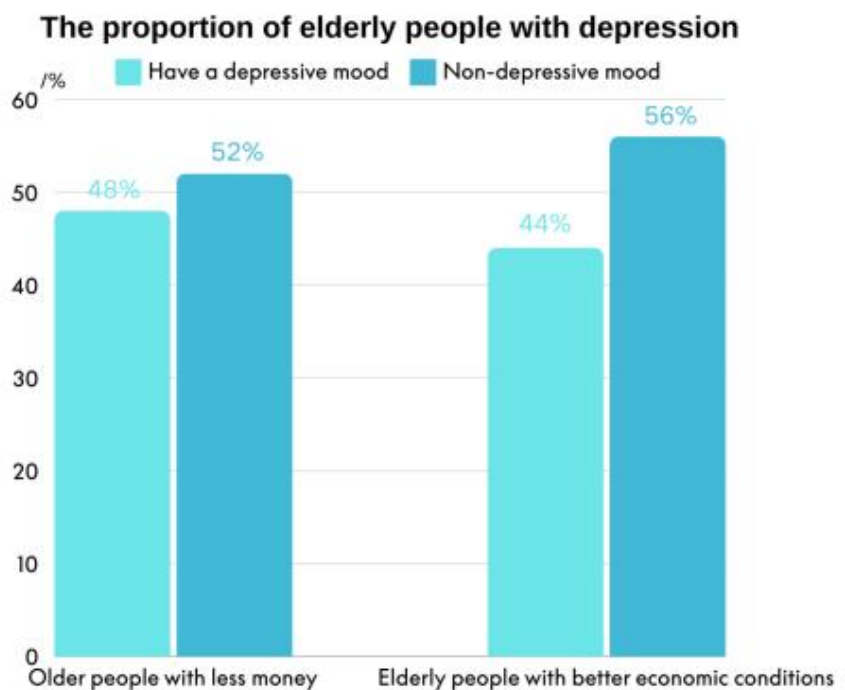


Figure 8 : Statistical chart of the proportion of depressed elderly people

3) How to apply emotional experience design in product design for the elderly

First of all, through questionnaires, interviews, and other means, an in-depth understanding of the elderly's living habits, interests, psychological needs, etc., provides a strong basis for product design. Then, during the product design process, prioritize the

details of the design, starting from the subtle user experience, so that the elderly feel comfortable and enjoy the experience of using the product. Emotional experience design not only focuses on emotion but also involves visual design, interface design, color design, and other aspects. In the elderly product design, these design elements need to be organically integrated to create products that meet the aesthetics and needs of the elderly.

As can be seen from the above three points, emotional experience design plays an important role in the design of products for the elderly. This design can improve the quality of life of the elderly by satisfying their psychological and emotional needs. The application of emotional experience elements in the design of elderly products requires an in-depth understanding of user needs, attention to detail design, and integration of a variety of design elements.

4.3 Emotional Experience Design Scheme for the Elderly

4.3.1 Source of Design Inspiration

The shape inspiration comes from the succulent pot, and the function inspiration comes from the sampling questionnaire survey and the data reference of the products commonly used by the elderly or various things inconvenient.

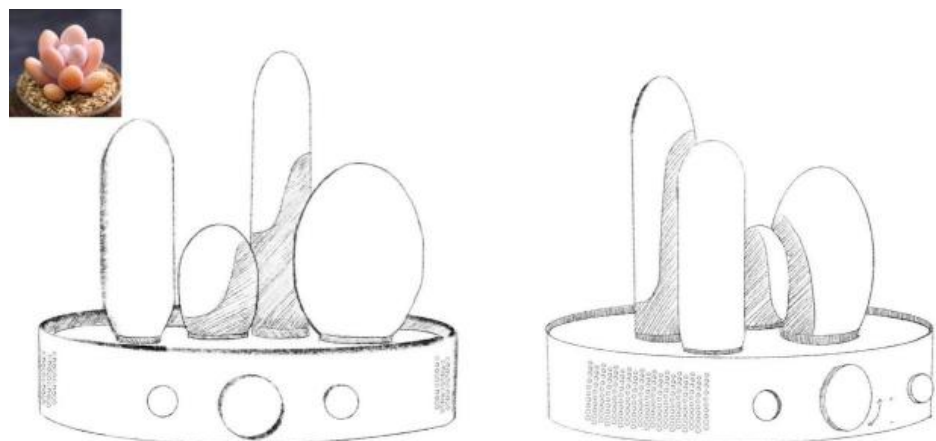


Figure 9: Design sketch

4.3.2 Description of Functional Ideas

This product is mainly designed to improve the emotional experience of the elderly. Young people can download the software on the mobile terminal and long press the button to talk with the elderly at home. Each person can choose a small group image accessory, which is placed by the magnetic magnet and can be combined, arranged, and selected at their discretion. With stickers to distinguish the image, increase the warm and lovely feeling, and achieve a good communication effect, this image accessory can act as a warm light in the night mode, for the elderly to increase the convenience of getting up at night. Secondly, the product can actively record sounds greater than 70 decibels and automatically upload them to the APP and make notifications through vibration, so that young people can determine whether there are some unsafe events, such as when elderly falls, heavy objects fall, and the elderly are locked after the door is closed when the wind is too strong, which is conducive to timely detection of problems. Finally, the product is combined with the radio, and the fuselage itself has a simple button for the elderly to control, and young people can assist in the use of mobile phone

software, increasing practicality. The product is designed to help the elderly to relieve loneliness and enhance happiness.

4.3.3 Color Selection

The overall tone is warm, giving a warm feeling. The upper accessory itself is beige white, the lower magnetic suction cup is grayish-pink, the base is light yellow, and the buttons are light brown. Beige and yellow are more neutral and stable colors, not too eye-catching, and can make the elderly feel comfortable and at ease.



Figure 10: Design model drawing



Figure 11: show details

5. Conclusion

From a global perspective, population aging has become a social phenomenon that is not to be ignored. This phenomenon not only presents a challenge to the social security system but also brings unprecedented development opportunities for the elderly product industry. The continuous growth of the elderly population means that a huge market size is quietly forming. This market not only covers the traditional daily necessities, such as clothing, food, household items, etc., but also extends to health care products, leisure and entertainment equipment, and a series of products that meet the specific needs of the elderly. The richness and diversification of these segments are a vivid portrayal of the vigorous development of the elderly product market. In addition, the emotional support segment is also an important part of the senior product market. With the growth of age, the elderly need more family companionship and care. Therefore, products that can provide services such as emotional companionship, psychological counseling, and social interaction will be warmly welcomed by the elderly. Looking to the future, with the continuous progress of science and technology and the continuous upgrading of consumer demand, the elderly product market will continue to maintain rapid growth. This will not only inject new impetus into economic development but also bring a better life experience to the elderly.

With the rapid development of society and the significant improvement of material living standards, the spiritual needs of the elderly have gradually shifted from the material level to the emotional level, which is particularly striking. In modern society,

although the material living conditions of the elderly have been greatly improved, their emotional loneliness has become more and more intense. They are eager to get more emotional care and sincere companionship, but in real life, they often face difficulties such as their children being busy and they have fewer friends. Therefore, the research on emotional companion products for the elderly has important social significance. Providing emotional companionship services for the elderly through technological means can not only meet their spiritual needs, and improve their quality of life and happiness, but also promote family harmony and social stability. In addition, the research on emotional companion machines for the elderly has a wide range of application values. It can be applied to a variety of scenes such as families, nursing homes, medical institutions, etc., to provide more comprehensive and personalized emotional companionship services for the elderly.

In terms of technical realization of the emotional companion machine for the elderly, we can use advanced technologies such as artificial intelligence, big data, and cloud computing to provide intelligent recognition, natural language processing, emotion analysis, and other functions. These technologies can help machines better understand the needs and emotional states of the elderly, so as to provide more precise and personalized services. In terms of application scenarios, we can explore emotional companionship services in various scenarios such as families, communities, and medical institutions. For example, in the family setting, the emotional companion machine for the elderly can be connected with smart home devices to provide security monitoring, health reminders, entertainment, and leisure services for the elderly; In the community scenario, it can collaborate with the community service center to provide social interaction, cultural activities and other support for the elderly; In the context of medical institutions, it can be integrated with medical equipment to provide health monitoring, rehabilitation training and other services for the elderly. These services will contribute to the improvement of the quality of life and well-being of the elderly.

However, it is also necessary to pay attention to data security, privacy protection, ethics, and other issues to ensure compliance and acceptance of the technology application, to ensure that the product truly benefits the elderly.

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