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Research on Emotional Design of Indoor Lighting Fixtures in Nursing Homes

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Abstract: *The environmental issues of nursing homes have become a hot topic in society today with the increasing aging population. At present, the use of indoor lighting fixtures in nursing homes is too monotonous and tedious, and their potential has not been effectively explored. By utilizing emotional design theory and fully considering the emotional needs of the elderly, an emotional design strategy for elderly care home lighting fixtures is constructed from four aspects: appearance design, functional design, and lighting atmosphere creation, thereby improving the quality of life and happiness of the elderly.*

Keywords: *lighting fixtures; nursing homes; emotional design theory*

1. Introduction

In 2022, China will enter a stage of deep aging, and the issue of elderly care will become increasingly severe. As an important factor affecting the quality of elderly living environment, indoor lighting fixtures in nursing homes can not only solve basic lighting problems, but also affect users' emotions, which is an effective way to improve elderly care services. However, currently, there are a series of problems in the design of indoor lighting fixtures in nursing homes in China, such as outdated appearance, single function, and lack of humanistic care.

Professor Donald Norman proposed the three-level theory of emotional design, emphasizing "user centeredness and full consideration of users' diverse emotional needs." [1]It is considered the "most complete and philosophical theoretical system" in research related to emotional design.[2]Introducing it into the research of indoor lighting fixtures in nursing homes can help elderly people better use and experience products, and improve their quality of life through emotional care. Based on this, this article starts from the perspective of emotional design, and takes the current situation of lighting fixtures in nursing homes as the basis. By combining the needs of the elderly with the emotional design performance of lighting fixtures, it summarizes the emotional design strategies of lighting fixtures in nursing homes, thereby enhancing the happiness of the elderly in life.

2. The Current Situation of the Use of Indoor Lighting Fixtures in Nursing Homes

Luminaires are one of the products that the elderly are most exposed to and frequently used in the elderly care space. They also form the foundation of the image and environment of the nursing home, directly reflecting the quality of life and happiness index of the elderly in their later years. However, most nursing homes in China do not pay enough attention to the selection and use of lighting fixtures, and there are generally the following problems.

Firstly, the appearance of the lighting fixtures is outdated. The design, structure, color, and material performance of indoor lighting fixtures in nursing homes are too outdated and lack innovative awareness, making it difficult to adapt to the matching needs of modern elderly care environments. From the perspective of design, most nursing homes tend to choose geometric lighting fixtures. For example, the kitchen, restaurant, activity room, and other spaces of Chang'an District and Yieldercare Elderly Care Home in Xi'an City all use 600 * 600mm square embedded ceiling lights, 50 * 50mm square corner lights are used in the corridor space, and 6 circular down lights and 12 circular spotlights are installed in the entrance and hall space. The entire elderly care space is mainly designed with square and circular lighting fixtures; In terms of structure, closed and enclosed structures are the characteristics of most nursing home lighting main lights, usually covered with a lightweight frosted

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shell to soften the light source intensity. The construction of elderly desk lamps often emphasizes stability and safety more; From a color perspective, the lighting fixtures in nursing homes use three light colors: warm yellow, warm white, and cold white, and are interspersed and used according to different spatial types. The entrance of the nursing home for the elderly in Heyi is equipped with cold white ceiling lights, and the top of the hall space connected to the entrance is equipped with warm white downlights and spotlights. The combination of light and color emphasizes its spatial attributes as an important place for communication.

Secondly, the single function of lighting fixtures. The lighting fixtures used in nursing homes belong to the category of traditional lighting, generally using a single type of lighting fixture, which has problems such as insufficient illumination, monotonous light color, and outdated control methods. In terms of lighting, the indoor lighting in nursing homes is too dark, resulting in insufficient lighting. Especially in some bedrooms with poor lighting, the air is not circulating, and artificial lighting is essential during the day. The relatively enclosed restaurant space has an average illumination level between 26lux and 30lux, so auxiliary artificial lighting is also required during dining; The monotony of light and color is also a significant problem in nursing homes. The lighting fixtures in nursing homes are mostly warm yellow, warm white, and cold white in three color effects. In addition to the intended color matching in the reception hall, areas such as the kitchen, dining room, elderly reading room, bedroom, and activity room are all illuminated with a single cold white light or warm white light. These lighting fixtures are mostly cold white energy-saving lights, and are often covered with a white translucent shell, making the entire space dull and monotonous; From the perspective of the control method of lighting fixtures, most elderly care institutions are equipped with ordinary press type double switch control. The installation height of the switch is slightly lower than the standard height, usually 1.2m, and a few switch positions are higher than 1.6m. For example, the activity space of the nursing home for the elderly in Heyi is equipped with a push type switch with a installation height of 1.65m to prevent the elderly from reaching out and touching. The bedside light control switch in the bedroom of Sanqiao Senior Apartment is set at a height of 0.65m, making it convenient for the elderly to use. In addition, due to the passage of time, the lighting circuit control mode has become outdated and outdated, bringing many inconveniences to residents' lives.

Thirdly, the design of lighting fixtures lacks humanistic care. Firstly, the use of indoor lighting fixtures in nursing homes did not take into account the visual specificity of the elderly population. As people age, their vision gradually decreases and their demand for light also increases. The nursing home mainly uses incandescent lamps and energy-saving lamps, without taking any blocking measures, resulting in uneven distribution of light and easy formation of glare, which is detrimental to the visual safety of the elderly. For example, in the 20 meter corridor space of the Chaoyang Elderly Apartment in Xi'an, an average of 3 meters is equipped with a tube lamp, which can meet the lighting needs but also produces strong glare, which is easily causing visual discomfort for the elderly; Secondly, the design of lighting products fails to reflect the dignity and value of the elderly as the main body of life. Some nursing homes often neglect the interaction and communication between the product itself and the spirit and emotions of the elderly when choosing lighting fixtures, emphasizing too much on the "brightness" and "simplicity" of the lighting fixtures, believing that these lighting fixtures are the most suitable for use in nursing homes; Finally, the lighting design in nursing homes lacks cultural connotations. Cultural needs are an important component of the lives of the elderly. As important environmental facilities, lighting fixtures constantly affect their lives. Lighting fixtures with cultural connotations can make the elderly feel relaxed and comfortable during use. However, most nursing homes choose to use energy-saving lights or white woven lights, with monotonous forms and control modes. The lighting arrangement and material matching together create an atmosphere that does not reflect cultural connotations.

In summary, under the influence of traditional lighting design concepts, elderly care institutions have made the basic lighting functional needs of the elderly in different spaces such as bedrooms, restaurants, kitchens, bedrooms, activity rooms, and rehabilitation rooms the core of lamp selection and application. However, they have not paid enough attention to the emotional and other needs of the elderly population, resulting in a lack of emotional expression in the lighting of elderly care institutions, This not only restricts the continuous improvement of the physical and mental health of the elderly to a certain extent, but also limits the establishment and improvement of a good image of the nursing home itself.

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3. Emotional Design Analysis of Lighting Fixtures in Nursing Homes

Elderly people have diverse emotional needs, and use emotional design theory to explore the emotional touch that lighting fixtures can bring. Starting from the instinctual, behavioral, and reflective layers,[3] this section designs the color, appearance, material, and operating methods of the lighting fixtures to create emotional resonance between the elderly and the lighting fixtures, thereby obtaining a sense of peace and happiness brought by the product.

Firstly, in the theory of emotional design, the instinctive level emphasizes the emotional touch brought by visual expression, including the shape, material, and color design of lighting fixtures. From the emotional language of appearance, the use of points, lines, and surfaces can create different psychological feelings for the elderly, such as pleasure, balance, and mystery.[4] American scholar Roina Reed Costa believes that slow curves have a sense of elegance and softness that is closer to human psychology. In the design of lighting fixtures in nursing homes, designers can use curves that are emotionally close to people to soften their hearts; From a material perspective, the texture and texture displayed by different materials can give people different visual and tactile experiences. For example, dense and heavy materials give people a sense of weight, while soft and lightweight materials give people a sense of buoyancy. The smooth metal surface has strong reflectivity and plasticity. The natural texture of wood gives people a fresh and gentle feeling, which can evoke memories of nature. In nursing homes, wall lamps usually use wooden lampholders, which are not as cold as metal or as luxurious as crystal, but can make the elderly feel peaceful and easily associate with the warmth of home; From the perspective of color, people are accustomed to linking color with behavior, things, will, and concepts, thereby giving color symbolic meaning. For example, the red tone has the effect of accelerating blood circulation, giving people a sense of enthusiasm, joy, and vitality. At present, the light source colors of the lighting fixtures in nursing homes are basically white and warm yellow, creating a warm and clean feeling for the elderly.

Secondly, the behavioral level mainly considers the functionality of lighting fixtures and the emotional reflection generated by the unconscious behavior of the elderly, and establishes recognition of elderly care spaces through the setting of usage methods and reasonable allocation of space. The use of lighting fixtures in nursing homes is mainly reflected in the control of lighting. We should choose lighting control systems that are suitable for the needs of the elderly, making them feel convenient, satisfied, and respected. Naoto Kanazawa once designed a lamp with a tray that can hold items such as keys or mobile phones. Although the lamp is small, it has become a symbol of home; For the spatial configuration of lighting fixtures in nursing homes, as the elderly's vision gradually declines, there are high requirements for the installation position and quantity of lighting fixtures. If the height of the house is around 2.7 meters, then it is suitable to use ceiling lights or chandeliers. It is best to add some lampshades to make the brightness of the lamps softer, the lighting range wider, and make the elderly's mood more comfortable. You can also install some small wall lamps, desk lamps, and other lighting fixtures in the room, adding some complexity and decoration to the life of the elderly.

Finally, the level of reflection is the highest, as it permeates the cultural and personalized aspects of lighting fixtures to receive positive emotional feedback from the elderly. At the cultural level, the elderly generally show nostalgia, which reflects their high recognition of their original Lebensraum and cultural beliefs, and they jointly carry the special emotional needs of the elderly. As a necessity in daily life, lighting fixtures are the most direct cultural carrier. A good lighting fixture can create stable place characteristics, leveraging the power of culture to surround familiar things around the elderly at all times, helping them reduce stress and ease their mood. However, at present, most of the lamps in nursing homes lack the implantation of cultural elements, and the overall style is single and modular. In terms of personalization, if the use of lighting fixtures in nursing homes focuses on "personalization" factors, which can highlight the exclusive hobbies and habits of the elderly, it can make them more inclined towards the current living environment. Recently, Guangbao Technology Company designed a "Dream Awakening" alarm clock. Using modern digital technology to provide users with the experience of waking up in a comfortable and fulfilling mood.[5]

4. Emotional Design Strategy for Lighting Fixtures in Nursing Homes

Based on the previous analysis, the multi-level design of lighting fixtures can evoke emotional resonance among the elderly. This section will develop specific emotional design strategies for elderly care home lighting fixtures from four aspects: exterior design, functional design, and lighting atmosphere creation.

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Firstly, the exterior design of lamps with multi-dimensional expression. Through the emotional analysis of the shape, color, and material mentioned above, it can be found that there is a common problem of outdated and single appearance of lighting fixtures in nursing homes. For this type of problem, designers should flexibly change their expression methods when designing the appearance of lighting fixtures, use multi-dimensional design language to meet the natural and regional emotional needs of the elderly, and appropriately integrate modern intelligent technology to create emotional resonance for the elderly. From a natural perspective, the elderly are naturally fond of the original ecological environment. Therefore, when designing lighting fixtures, more consideration should be given to using natural materials such as cotton, hemp, bamboo, logs, etc., to guide the elderly's perception towards nature; From the perspective of local culture, lighting fixtures can serve as a tool for empathy, satisfying the nostalgic psychology of the elderly through cultural infiltration. Taking the Guanzhong area as an example, the shape of the gatehouse in residential culture can be transformed into cultural symbols. By summarizing the preliminary lines of the gatehouse, and then focusing on extracting the curved upward sense of the wall eaves, the surface features of the gatehouse building can be transformed into the shape of the lighting fixtures; From an intelligent perspective, emotional changes in the elderly can be regulated through sensory stimulation. For example, the emoi intelligent audio light combines four functions: aromatherapy, humidification, speaker, and lighting. Through modern intelligent technology and emotional design, it connects smell, vision, and hearing with the atmosphere of life. Improve sleep quality through aromatherapy and lighting, adjust the timing of music on and off, awaken naturally in the morning, and create a beautiful feeling.

Secondly, the functional design of lighting fixtures that emphasizes both reason and reason. The functional setting of lighting fixtures should fully consider the emotional demands of the elderly in different spatial attributes, so as to achieve interconnection and linkage between functions and emotions, thereby strengthening the elderly's sense of spatial belonging. Firstly, the safety of lighting fixtures is the first criterion for their functional considerations. For some transitional spaces, auxiliary lighting equipment should be installed at the entrance or corridor of the nursing home to avoid being too dim. Choose a semi transparent or opaque light shield to block the light source in the line of sight to prevent danger caused by shadows, and at the same time, avoid the light source from generating reflective glare on the polished floor, causing collisions and falls; Secondly, the practicality of lighting fixtures is an important manifestation of their functional value. Nursing homes have specific requirements for the area of each space, which are more stringent than ordinary residential buildings. The bedroom is the main living space for the elderly, with two-thirds of the day spent in the bedroom. It generally requires soft, adjustable, and noiseless lighting fixtures. The setting of lighting fixtures in functional spaces such as kitchens and bathrooms should ensure sufficient brightness. Due to the mirror setting, attention should be paid to the position of lighting fixtures to prevent shadows; Finally, the interestingness of lighting fixtures is an important indicator to measure their functional richness. For example, the lamp "puppy toy" practices this concept. The shape of the puppy toy resembles that of a "puppy", and the designer has made an opening and closing design on the abdomen of the lamp for storing medicine. Elderly people interact with them when using them, enhancing the fun and interactivity of the lighting fixtures.

Thirdly, create an adaptive lighting atmosphere. Firstly, lighting can outline the space of a nursing home. The artificial light source is cleverly installed indoors, and through the control of light and shadow effects, virtual boundaries are depicted in the boundless space, achieving a harmonious and beautiful lighting, interior decoration, and overall structure. Integrating light and shadow art with entities, highlighting regional characteristics or cultural concepts of nursing homes, and thereby enhancing the emotional connotation of the entire space; Secondly, in the design of lighting systems in nursing homes, the combination of different lighting methods can present an infinite image of space, guiding the elderly's visual experience through changes in light, and ultimately achieving emotional satisfaction from a psychological perspective. In nursing homes, different types of lighting fixtures can be used to enrich the overall sense of hierarchy, and the characteristics of the space can be further highlighted through the interweaving of light and shadow; Once again, lighting can define spatial areas, and the use of lighting can achieve the effect of virtual division of space. By combining strong and weak light, spatial attributes can be further strengthened, and the effect of dividing spatial domains and creating virtual personal spaces can be achieved. In the space of the nursing home, the reception hall can be guided and illuminated by wall and floor lights, and separate chandeliers can be installed in each corner to provide consumers with a warm and comfortable trading experience; Finally, lighting can also adjust the scale of space. By adjusting the intensity of indoor light, people's visual perception can be altered, resulting in an illusion of space size. In nursing homes, this principle can be used to compensate for the original shortcomings of the building space. For example, in open areas, soft

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lighting is installed to enhance the warmth and comfort of the entire room. Soft lighting is installed at lower levels to weaken the edges of the space, and the use of light and shadow provides a virtual extension of the space, reducing the sense of oppression on the roof.

5. Conclusion

This article focuses on the emotional design of indoor lighting fixtures in nursing homes. By analyzing the current use status of indoor lighting fixtures in nursing homes, and the emotional design of lighting fixtures, a strategy for emotional design of lighting fixtures in nursing homes is constructed. Its strategy is mainly reflected in four aspects: multi-dimensional appearance design of lighting fixtures, functional design of lighting fixtures that emphasizes both emotion and reason, and the creation of adaptive lighting atmosphere, in order to meet the diverse emotional needs of the elderly. Indeed, there are still many different perspectives to explore in the research of lighting design in nursing homes. We look forward to more scholars discussing this and providing theoretical guidance for promoting the overall upgrading of the living environment in nursing homes.

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References

[1] Huang Huiqin, Xie Yuwei. Research on Bamboo Luminaires Based on Emotional Design [J]. Packaging Engineering, 2019, 40 (20): 164-168.
[2] He Tianping, Fu Xiaoya. Emotional Turn of user experience design: Interactive Innovation Trend of Internet News Products [J]. China Publishing, 2022, 535 (14): 9-14.
[3] Xiang Fan, Tan Liang. Cold Thinking under the Emotional Wave: A Review of "Emotional Design" [J]. Decoration, 2019312 (04): 78-80.
[4] Zhou Xiaohan, Song Wu. Triggering Touching Design - Inspiration of Emotional Research on Emotional Design [J]. Journal of Nanjing Academy of Arts (Art and Design), 2021198 (06): 69-74.
[5] Lin Lili. Research on the exterior design of elderly home care robots based on emotional design [D]. Qingdao University, 2022.