Vol.3 No.3 2022
https://doi.org/10.37420/j.cer.2022.026

Analysis and Development of Modern Interior Lighting Design

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Abstract: *Daylight and light play an important role in everyday life, and people will live continuously after sunset with light. The reliance of life on light is also relatively strong, modern interior design lighting is a must device, and the requirements for lighting design are high. The purpose of this paper is to analyse the application of interior lighting design as well as development trends; the key points of lighting design are analysed, using methods such as the interior green lighting method and literature analysis. The principles of interior lighting design by scholars, user needs and practical application of design are summarised while questions are raised about the shortcomings.*

Keywords: *interior lighting; lighting design; green lighting;*

Introduction

The development of lighting in the last twenty years or so has developed at a faster pace, for the development of the continuation of the design and abandoned ideas collide with each other, the field of interior lighting design is on the rise, innovation and development go hand in hand, so that the field of lighting design continues to improve, but there are still some applications of design and does not take into account the reasonable needs, the following summary and summarize the main points and shortcomings of modern interior lighting.

In the 1980s interior design began to emerge in China, and by the mid-1990s interior design was in a period of initial development, starting with simple decoration, with no more design applied to it. Initially the lighting used was more warm and dominated by crystal lights, and it was not until the early 21st century that interior design began in small and medium-sized cities, however, lighting design did not form a proper understanding in the minds of ordinary people, and few people hired professional lighting designers. In the current division of labour in interior design in China, lighting designers are unable to participate in it, and interior designers only stay on the surface of the lighting atmosphere. Professional lighting design is no longer a matter of generating a light source to illuminate the whole house; lighting design is an important part of the whole design work and complements the theme of the design. The acceleration of the urbanisation process has changed the entire structure of the city, resulting in dense living groups and bringing great changes to the living environment. The consumption of all kinds of resources is very large, of which the lighting consumption of buildings reaches about 50% of the total consumption of society, so we have to seek a healthier way of lighting, to achieve healthy lighting green lighting, for the sustainable development of indoor lighting design.

Study of domestic lighting

Types of lighting

For indoor lighting you can be chosen from a very large number of types, to better apply the light to the interior, you need to understand the classification of lamps and lanterns, according to the space and user needs to match the light, reasonable scientific use of light, to achieve a comfortable state, to play the best effect of light.

(1) Table lamp types: table lamps are widely used in the interior, a wide variety of appearance and internal role are played extremely rich, it is mainly used on the desk study or in the office, dining table embellishment lighting, etc., is a local lighting to provide a kind of lighting lamps. In the optimization process of lamps, the role of the table lamp is not only a simple lighting tool, but also changing in terms of usability and aesthetics, becoming a decorative object for the interior space, while mixing the functions commonly used in life, which is quite interesting to apply to the interior design.

(2) Wall sconce types: wall sconces are widely used in the interior design of many countries, and wall sconces are mainly installed on walls and stone columns, and there are now two types of common wall sconces: wall-mounted and hanging. Wall lamp design is very rich in shape. It is design plasticity is very strong, so the wall lamp in the domestic and international indoor lighting applications is more.

(3) Suspension lamp type: chandelier application space should be high, leaving enough comfortable space, general lobby, living room and other public space use is more common. According to the continuous upgrading development of lamps and lanterns, modern chandeliers use very adaptable to space needs, can have a better stretch performance, can be adjusted according to people's needs for stretching difference length is widely used in the interior lighting design.

(4) Ceiling light type:In interior lighting design, the most commonly used lamps are ceiling lights. Ceiling lights are of various shapes, simple, stylish, elegant and warm; at the same time, it has a very wide range of applicable types and scope and can be used in different combinations of arrangements or with other lamps, thus achieving a comfortable experience of interior lighting design.

Design principles

For the design principles of lighting scholars put forward the following points.

(1) The principle of safety: interior design safety should focus on the principles followed, design in the safe and reliable above in order to talk about practicality and aesthetics, the design of the lighting system is also a very important principle, for the construction of lamps and lanterns such as line arrangements should be put in place, for the quality of lamps and lanterns and later maintenance of maintenance, are to ensure that the safety of users in the process of use is better protected. In order to guarantee the safety of the living environment, strict safety measures need to be taken to prevent leakage and short-circuiting to avoid unnecessary accidents.

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(2) The principle of economy: in the interior lighting arrangement, it should take into account the quality of lamps and lanterns, such as taking into account the moisture resistance,such as taking the moisture resistance into account, etc. Achieve the best value for money through suitable lamps and lanterns for space art design, while conforming to the size of the size, in line with the brightness irradiation range, too bright light to give discomfort, while also making the loss of resources, can not blindly pursue gorgeously, resulting in dazzling light and other inapplicable waste of resources.

(3) The principle of aesthetics: under the premise that the basic needs are met, the appearance of the lamps and lanterns, materials, colours, etc. need to be applied with the atmosphere of the interior design, the number and height of the lamps and lanterns need to be designed aesthetically to match, choose the right lamps and lanterns, use indoor light to strengthen the texture of indoor objects and change our visual perception.

(4) The principle of functionality: ensure the illumination of the lamps is used to create a warm and comfortable environment and stabilise the brightness of the lighting, to divide the space into zones and to guide the lighting function. To meet the intensity of light on the comfort, to further meet their own physiological needs, the light has its own meaning, is the space to produce the atmosphere or lighting or highlight a small area, which is designed for its functionality.

Summarized as the above 4 important principles, interior design in style, style, colour matching are very important. Lighting is also an important collocation of decoration, no lighting design will not play its role and aesthetics. It may account for a smaller proportion, placed more also in a higher position, and usually also to people ignore its importance. However, in the design, any change or adjustment of the lighting will change the effect produced on the space. Changes to the colour of the luminaire, and number of luminaires, the intensity and colour of light and the position in which it is placed can have a different effect on the aesthetics of the space, the experience, the feeling of belonging to the area and so on. Lighting plays a practical function in lighting and also plays an important role in the aesthetics of the design.

Application places

The atmosphere of the spatial environment is shaped by light and shadow, people and objects in space need to be illuminated by light in order to present volume, space can block light out, light can illuminate space, people's perception of the spatial environment is inseparable from light, the effect of light and shadow irradiated by light is an invisible objective object, the projection presented is the presence of light and shadow that cannot be touched and taken away. Some people believe that light is "sentient" and that the effects presented by light resonate with people. The designer uses light and shadow effects to shape the interior space environment following the unified aesthetic direction of "light, colour, shape and texture" that is worshipped in modern interior design. Lighting has a certain plasticity and can break the limitations of weather and time. Therefore, the element of light and shadow in modern design creates the atmosphere of the interior environment, Yang Gang pointed out that in the lighting atmosphere of the tea room space.

A good space lighting is necessarily very important, such as exhibition hall lighting needs to be precisely positioned on the object, the angle and irradiation surface should be designed to achieve the best effect.

For food also need lighting effects, in design practice, scholars believe that the restaurant as an important place for people to eat and communicate, in the lighting design affect people's taste psychology, reasonable design lighting, so that people better access to diet, environment and psychological harmony and unity is the goal of design. If the lighting in the restaurant is based on soft, warm colour stripes, people are likely to feel a cordial and warm atmosphere, thus relaxing the body and mind, If the use of cool and soft lighting, people will have a cool and quiet sense of comfort these artificial light than natural light can affect the heart, therefore, grasp the design points to achieve the unity of people's visual health and dietary health.

Many articles refer to colour matching and the application of colour to different spaces presenting different effects to design the lighting environment of the restaurant, certain principles must be followed. For lighting colour matching, the jewellery display space is one of the important design spaces, where the texture of jewellery and metal materials need to be illuminated with bright light sources to present a crystal clear effect.

Demand factors

A large number of articles have mentioned that the design should correspond to the needs of the space, that is, the design for the people who use it, and the design on the basis of the needs of the users is the appropriate design. In particular, interior lighting design, design should be designed for the use of people and design, especially the lighting of living space, for the user's life preferences and habits to design. If children at home are nearsighted, they should be designed with the right height and brightness to avoid weak lighting for learning and reading eyesight is affected.

In the lighting design, the linkage presented by the individual space, a single light appears lonely and cold, the light itself has the function of distinguishing the area, the space is divided, the use of function is clear, and it is more convenient and comfortable for the user.The space is made to combine with each other to achieve a higher experience of feeling, and the desired effect is presented through the lighting collocation. It is also easy to overlook this point in living spaces, where the requirements of the space for the user and the comfort of the user should be given attention. In the process of interior lighting design, technical means such as diffuse light, hidden reality, motion and static can be used to control the angle of the light and the lighting method, using these technical means can play a good rendering effect on the space. Scholars in the narrative, space lighting with a better experience. Users of space are demanded and desired, for the demand is to meet their basic lifestyle use of space, the desire is to further improve the space requirements, generally for the more difficult to achieve the function. If lighting is used in an interior space, the requirements for cooling and warmth, the requirements for brightness and other personal preferences are pursued.

Applied to indoor space, to highlight a particular home or furnishings, you can use brighter lights to render, highlight the key points, in the light gathered at the same time need to enhance the level and three-dimensional sense to the maximum extent, so that the environment and space linkage more interesting. Interior lighting design needs to be based on the style of design, the needs of the user for the actual design, can not be generic, uniform even if it can barely reach illumination, but the actual use of space inconvenience, each space has the properties of each space, should be given a specific design, for space users is also the same, according to the use of the requirements and like to plan and design. Some scholars point out that the design of lighting art is intrinsically linked to the basic needs of people. Firstly, there is the physiological need, i.e. people's need for

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clarity and safety for indoor activities. The second is the perceived evaluation of the comfort and warmth of the environment in which people live. It is in meeting the basic needs that design can enhance the user's experience.

Colour palettes to match

Colour in interior decoration can add ambience to a space and make it visually richer. Lighting is more intense in an interior space and can also influence people's senses and emotions. Take the cold and warm colours, which will greatly affect the physical examination of the user and will also affect the partitioning of the space function and the psychological and emotional feelings. The colours of light and space have the necessary connection and will give a strong visual feeling and make the psychological ups and downs. Warm colours give pleasure, the brighter the colour, the more it stimulates the senses. Warm colours, mainly orange, will prompt the blood to rise and flow faster, producing hyperactivity and agitation, making people excited and active, causing endocrine changes in the human body thus briefly appearing nervous and excited feelings. Like some bright colours, such as yellow, orange, etc. can bring people, lively and restless feeling, especially this type of warm lighting applied to food, bright colours can stimulate appetite, cause psychological feelings, the food itself is high gloss, with warm colours baked using the meal to maintain a pleasant feeling, stimulate the sensory organs, add users psychological experience.

Cool colours are suitable for use in hospitals, offices, classrooms and other spaces where concentration is needed. The long-term use of warm colours can cause people to feel restless and psychologically disturbed, which is not conducive to maintaining concentration and can affect work efficiency and emotional stability. In colour psychology, cool colours lower blood pressure, reduce the stimulation of the senses, suppress emotions and reduce the psychological effect of stress. In hospitals it is suitable to use colder colours, such as blue and green, which can make people think emotionally the stable, but also with the psychological feeling of hope, more hospitals will also match the ground rubber and wall coordination, giving hope and awe to patients and chaperones.

Space and senses of atmosphere

The mood atmosphere of the space can be described as something that can be seen and touched, that is, a feeling and experience, lighting is one of the important factors in shaping the sense of space, mood in the space can be achieved through lighting to divide the space, light and shadow to create a space atmosphere and render the mood of the space. It can be summarised in the following three directions.

Creating mood through lighting

In the application of special spaces, the creation of mood allows people to integrate into the space, and some scholars have proposed different ways to interpret the mood in the space through the layout of the space, the choice of furnishings and lighting design. Through the angle and overlap of the light, the light is faint with the furnishings to make the light present the mood. People will use lighting as a technique to shape the mood of the space, relying on the angle and brightness of the lamps to render to create the mood. Make objects light

and shadow staggered, highlighting three-dimensional, through the refraction of light and dark contrast present mood, to produce a strong visual effect.

Create atmosphere through lighting

Atmosphere is a strong mental reaction given by the environment through visuals and a psychological feeling given by the surrounding environment. Displays through the gathering of light can achieve a visual central role. For the use of lighting its light and dark contrast, angle, height, brightness and hue with, conducive to the creation of space atmosphere.

Rendering emotions through lighting

Space can express emotions, different space feeling on the presentation of different emotions, the power of space is quite powerful, such as in a closed space to produce anxiety, lighting is also the same, can drive the change of emotions, such as weak lighting to produce panic emotions. At the same time the rendering of emotions requires the mutual support and influence of different design elements, of which lighting is indispensable. The design of lighting can render the space, and conversely the space can bring about an experience that generates emotion, making the space more emotionally rich, so that people placed in the space can resonate with their own emotional needs.

Materials used

Different materials in the life experience of the feeling is also different, different materials can be shaped on the surface of the texture of different performance, lamps and lanterns used in the manufacture of a variety of materials, to give people the feeling of use with different materials and different.

The more commonly used materials on the market are summarised in the following categories: (1) thermosetting materials, which are mainly composed of epoxy resin, organic plastic, alkyd resin, polyester and other components, designers usually make them into lampshades shades, etc.; (2) bamboo, car barrel bamboo, bracing artemisia bamboo, Mao Nan ethnicity and other bamboo can be made into lamps and lanterns, providing new design ideas for interior lighting designers; (3) wood, ginkgo wood, red walnut wood, Water willow, spruce and other wood also help interior lighting designers to create an eclectic lighting effect; (4) new synthetic paper materials, polypropylene paper, blown paper, cellophane, polyester paper, polyester paper, etc. can be integrated into the interior lighting design, as different paper textures, smoothness, toughness, colour and other characteristics will be more or less different scholars have done an analysis of lighting materials, as well as the available range. Different materials can be used to present the shape of the luminaire, and the lighting effect varies. There are direct power sources available on the market, which are also the most commonly used, as well as solar energy, which can be converted into electricity in a reasonable way to help banks save resources and reduce costs. In addition, research and discovery of new energy sources such as electric gas generation, fuel cells, magnetic fluid generation and superconductivity technology can provide more possibilities for interior lighting design.

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Outstanding issues

In previous studies, a number of problems have also been identified in the use process or in the design process.

Dark light

This problem is more serious, can not reach the basic lighting, on the physiology, psychology have a certain impact, part of the family in the lighting effect is not good grasp, brightness is not enough or in order to reduce the use of electricity, resulting in space brightness is not enough, the use of traditional lighting, a space only a lighting fixture, lighting height is high, so that the actual use of light is not enough, resulting in the interior is too dark, long-term in such an environment This can have an impact on the residents' eyesight, cause dizziness and, in serious cases, lead to bad moods and serious health hazards.

Too much light

The luminaire should be selected in a reasonable manner to suit, bringing a sense of insecurity, may also produce dizziness, not suitable for too dark nor too bright, indoor is also not suitable to increase too much reflective material, then it will increase the intensity of the reflection of light, will cause serious harm to the residents' eyesight and even health.

A greater proportion of cold light

One way of classifying light is to divide it into two types: cold light and warm light, which are used more in interior design. The main focus is on warm light, not only using warm lamps, otherwise people feel hot, but also need to use with cool light sources to assist the warm light to achieve a warm and comfortable feeling. The light source is too single, making the interior effect monotonous and boring, even if it achieves basic lighting but is not an excellent lighting design. Applied to the actual life, there is a part of the occupants love the cold tone of the light, if the cold light is too much, it will cause depression, serious living environment, affect the mood of the occupants and the atmosphere of living.

Inappropriate use of lighting

Applied to the actual design, many scholars will find this problem, blindly choose various kinds of lamps and lanterns for decoration, without respecting the design style to match, to make the space style mix and match, choose the right lamps and lanterns to make long-term living more comfortable. Lamps should choose the kind of soft, even, no dazzling, choose the right decorative style, space height, furnishings arrangement to choose lamps, create a sense of indoor space atmosphere, inappropriate lamps cause indoor light refraction strong, uneven irradiation, making the light uncoordinated, not conducive to the shaping of a comfortable space, bring uncoordinated effect.

Foreign lighting research domestic and foreign lighting design research status study

Compared with foreign countries, domestic professional lighting design development for a relatively short period of time, the United States lighting design in the 1950s only began to separate from architecture, interior design to become an independent discipline, while China's lighting design in about 30 years before the formation of large-scale industrial model, still in the development period, in lighting design still need further depth. Domestic lighting design part of the customer's own installation, or recommended by the supplier for decorative design, in the construction of traditional thinking, fewer people will hire a professional design lighting designer for the design of indoor lighting systems, another part of the interior designer to complete a unified lighting design. For this reason there is a shortage of talent training for lighting design in China, as well as a relatively short period of time to enter lighting design, and many aspects are still inadequate. Lighting design is in the early stages of development, most of the design will have to stay in the stage of environmental lighting, lighting does not pay attention to the decorative presence of lamps and lanterns, or only for the purpose of lighting, do not consider the decorative design with the existence of light is not only bright, and the pursuit of design also needs to go deep. In the interior design of lighting designers and users between the inevitable need to communicate, together to promote the concept of design for the user design, such cooperation should be increasingly close. Secondly, the deterioration of environmental resources brings me a reminder of both the protection of the environment and sustainable development and design has become an irreversible trend in sustainable development, so we are green, environmentally friendly, economical, sustainable design in the academic world is widely concerned, but also innovative applications and contemporary design, with this development, China's interior lighting design will also continue to move forward to the road of sustainable development.

Compared with architecture and interior design, lighting design started relatively late, and in the past 50 years, experts and scholars at home and abroad have conducted a series of studies on indoor lighting. 1880 onwards, lighting design began to pay attention to the improvement of quality and began to accelerate the development of lighting design, caring more about the effect of lighting on the spatial environment, and also focusing on the impact of light on people's psychology. As the domestic economy began to accelerate development, the country also attached relative importance to all aspects of development, the field of lighting design also has a faster development prospects, in the development of the last decade or so, the introduction of foreign advanced technology, design teams and independent research and development open, the overall level of technical equipment of domestic lighting appliance enterprises has improved significantly, the improvement of equipment technology, product quality, product diversification development, which are naked eye Visible development, while the funds and human resources invested in lighting design are significantly higher, lighting system design will also be increasingly perfect.

Trend developments

Diversification trends

Diversification is an inevitable trend in interior lighting design, with economic development diversification

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has also been driven. A single development will soon be replaced by a dull and uninteresting feeling over time. A single development will also gradually be replaced by diversification, different customers, designers have different styles promoted, interior design among the many schools, styles show the characteristics of mutual integration and interaction. In the field of lighting design, lighting design can form an interconnection between each other, lighting design is mainly to meet the needs of human life and life to adapt, from life to meet life, to achieve a comfortable state. Diversified development is inevitable and desirable, combining human thought, emotion and personality into the design concept.

The trend towards ecology

The protection of ecology is also an inevitable trend in development, and the harmony between man and nature is something that everyone should be concerned about at the moment. Nowadays, our society takes the theme of returning to natural environmental protection, energy saving and other sustainable natural development concepts, and society also focuses on development and protection, so we should also integrate the factors of nature and harmony in our design, and focus on whether it is in line with ecological development. As a guide, through a variety of measures to guide nature, environmental protection, energy saving and other objectives, to promote maintenance, the application of renewable energy and renewable technology, etc. through a variety of means of comprehensive movement to achieve the goals of lighting and decoration design, to create a harmonious environment beneficial to the body and mind.

Humanization trends

Humanization trend is the mainstream of the development of indoor lighting design, design for human services, humanized design is very necessary, for the service object and design, so that the design is more in line with the use of habits and in line with the aesthetic, in the design of the integration of personalized design, so as not to cause a uniform, will become a copy of the word, and no unique design, similar to the former, a single-word development will produce a dull and boring feeling. Based on the characteristics of the space environment, combined with the habits and preferences of the object of use, customized personalized design, to create a comfortable and pleasant space environment.

Intelligent trends

The 21st century is also an era of vigorous development of information technology, intelligence can be said to be seamlessly connected to our lives, intelligent design applied to lighting is also very common, sound induction, infrared sensing, touch induction, etc., many lamps and lanterns are connected to the network, mobile phone control lights, intelligent integrated system, etc., intelligent development is also called in order to develop the trend. Intelligent tendencies combined with modern science and technology and interior design have produced design features. High technology brings intelligent technology, can better control the lighting light and dark, colour and time, not only to meet people's diverse needs, but also can be combined with environmental protection and energy saving goals, to achieve the union of multiple advantages, can be said to be the inevitable trend of future development.

Humanisation trends

Humanized design can make customers more convenient and warm hearts, to develop in the direction of humanization, such as the user who comes to the bank for various businesses feel that the final lighting design effect makes the user feel comfortable and wants to come back again designers in the design of bank interior lighting must be combined with ergonomics and other related content. Take the lighting design of the ATM area of the bank as an example, and this area is characterised by convenience and is well liked by users. In addition, there are many young people using this area, so the lighting design requires something new, beautiful and bright. In the lighting design of the VIP area, it is required to give a feeling of home to the user, so while choosing bright, clean, simple and warm lighting colours, attention must be paid to whether the brightness of the interior lighting is evenly distributed and whether the intensity of the lighting is ergonomically appropriate. In addition, designers should avoid harsh interior light to provide a comfortable visual environment experience for users conducting business. For different areas of the bank and usage needs, designers should design interior lighting that is accurate to the user's dwell time and fits the purpose of use.

Conclusion

Green lighting is the first step towards the sustainable development of interior lighting. After careful study, it is found that the research and theory of interior lighting design lacks a scientific system of sustainable lighting design solutions, and most designers tend to ignore the relationship between lighting design and overall design. In the future, we need to combine lighting design with other elements, integrating lighting quality, standard psychology, aesthetics and energy efficiency.

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