Research on the Design of Public Space Environment for Aging Society

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Abstract. This paper studies the living space environment suitable for the elderly, because the elderly and the disabled have become increasingly prominent social problems. Through the discussion of the humanistic environment design method of the elderly and the disabled, the paper puts forward a new environment design which has the traditional characteristics and adapts to the new society to care for the elderly (the disabled). By studying and analyzing the background of social aging, the theory of public space environment design and the needs of the elderly, it is pointed out that the design of public space environment in the aged society needs to be implemented in detail design. The number of elderly people in public space will increase, give full attention to the public space outdoor environment quality, for the elderly to provide a variety of environmental facilities have long-term significance.

1. Introduction

1.1. Purpose of the study
Population aging is the inevitable trend of the development of the world today. Sociologists refer to 60-year-olds in countries with more than 10% of the total population as aging.

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Through the discussion of the humanistic environment design method of the elderly and the disabled, the paper puts forward a new environment design which has the traditional characteristics and adapts to the new society to care for the elderly (the disabled).

By studying and analysing the background of social aging, the theory of public space environment design and the needs of the elderly, it is pointed out that the design of public space environment in the aged society needs to be implemented in detail design. However, the detailed design comes from the physiological needs and psychological needs of the elderly Two parts. Compared with the physiological needs of the elderly, the details of the design of the care design is more focused on the psychological needs of the elderly to meet.

1.2. Research methods
With the development of China's population, the aging society, the development of the elderly design, to achieve sustainable economic development, social stability, "people-oriented" concept of the formation of
an important means of pension. Learn from countries to solve the pension model, and China to the present experience of accumulation, in many pension methods only community pension approach is most suitable for China's national conditions. Providing a suitable living environment for the elderly is essentially a kind of social pension behaviour, and needs different ways of providing for the aged in different social backgrounds. Through the detailed design of the public space environment, let the elderly in the daily life of active access to self-help ability, win social respect. Care for the elderly, help the elderly, environmental design needs to be implemented in the details of the design, and the details of the design is derived from the physiological needs of the elderly and psychological needs of the two part of the analysis. Compared with the physiological needs of the elderly, the care design put forward in detail design focuses more on the satisfaction of the psychological needs of the elderly.

2. Theoretical background

2.1. Theoretical background

According to the relevant report of the International Labor Organization, the total number of people with disabilities in the world is now more than 500 million, accounting for about 10% of the world's total population. Now the average annual increase in the number of disabled 15 million, that is, an increase of more than 40,000 people per day. In most countries, at least one out of every 10 people is disabled by physical, psychological and sensory deficiencies. At present, China has 64 million people with disabilities, accounting for 5% of the total population, is the world's most disabled countries, An average of every 10 families have a disabled or a disabled family, and their living conditions affect nearly 300 million relatives and parties concerned.

2.2. Domestic and overseas situation

People with disabilities are not only a large number, but also by the physical disability and the external environment of the obstacles in the social life in a variety of unfavorable position, so that the normal role of the play by many restrictions. From the perspective of the international community, building a barrier-free environment has become one of the mainstream of urban environmental construction, urban roads, transportation and buildings in the planning and design should be reflected in the important degree of urban civilization.

In 1959, the European parliaments adopted the "Resolution on the Design and Construction of Public Buildings for the Use of Disabled Persons". Under the influence and promotion of the international community, the concept of "accessibility" began to take shape. At the same time, the development of economy also makes it possible for industrial countries to invest a large amount of manpower, material and financial resources in the popularization of barrier free environment. At that time, President Kennedy consulted on this issue and formulated the world's first "barrier free" standard in 1961".The Israeli Building Law, enacted in 1963, and the American Building Law, enacted in 1965. The United States is the first country in the world to develop "barrier-free standards", its barrier-free environment construction has a multi-level legislative protection, and has entered the field of research and education; A variety of barrier-free facilities have a full range of layout, but also with the architectural art of harmonization, first-class, and serve the United States 37 million people in the important historical and cultural buildings, such as the United Nations Building, Capitol, the White House, Libraries, the High Court, the new National Gallery, the Kennedy Center, the Aerospace Museum and so on. These buildings are accessible from outside and within the barrier-free series of facilities, in terms of location, relationship is more appropriate, functional and form is also acceptable. For the more ancient buildings of the transformation of the work is also very careful and meticulous, respect in the shape of the original style, pay attention to the overall effect. After the transformation, there is no sense of superfluous, such as the transformation of the Arlington Unnamed Military Memorial Hall. As China has a large number of people with disabilities, while the peak of aging is coming, so the rise of barrier-free construction is imperative.
2.3. Design questions

2.3.1. The physiological and psychological needs of the elderly. Elderly physiological aging refers to the natural growth of the human body with age, degenerative changes in the body's physiological function and shape gradually appear, with the gradual decline of the ability to adapt to internal and external environment until the end of life activities.

Mainly in the following areas:

1) The body's internal system of perception system function decline
With age, the sensory capacity of the elderly will be a corresponding decline. First manifested in the auditory and visual aspects. Older people need to be stronger than the young 3 times to 7 times the light to see the object, so the intensity of light and lamp shape design must meet these characteristics of the elderly. Elderly hearing loss is mainly manifested as not sensitive to high-frequency sound. Shorten the distance with the speaker to make up for the hearing of the recession, and through touch, taste, smell to identify things, as a visual and auditory complement, affecting the elderly social space in the scale and form requirements.

Changes in the nervous system of the elderly are mainly due to the reduction of brain cells caused by slow response. Disease and aging at the same time affect the elderly to respond to external things. Elderly thinking ability is reduced, memory loss.

2) Reduced flexibility in the external body and perceived degradation of the environment
Older physical flexibility is reduced, muscle strength and control ability is also diminishing. Bones grow with age and become brittle. Because of the slowdown in the metabolism of the elderly, reduced secretion in the body, their response to temperature, humidity and climate is less sensitive, adaptive capacity is weakened and their health is susceptible. The psychology of the elderly is mainly affected by changes in physiological function, economic income and social relations.

This effect is a combination of many factors, and in a specific period of time, with one or two factors as the leading. The elderly population is less resilient to the environment than those of other age groups. So they have a sense of security, a sense of belonging, a sense of neighborhood, privacy, comfort has a more intense demand. Elderly is expressed as hope that the group organization or others can accept themselves, and hope to be in the activities of groups and others to be respected and recognized. To create a good living environment, to provide space for the elderly activities, contribute to the enhancement of the sense of belonging to the elderly and regain. The elderly for the main place of life and the survival of the space to have a strong sense of dependence. Life in the elderly on the privacy requirements are higher, by the violation will cause mental anxiety. Old people on the comfort requirements are different, the temperature, cold, overheating, glare are very sensitive. Old people like a quiet environment, fresh air, lush vegetation.

2.4. Design direction recommendations
The design of space environment is analysed for the public space of the physiological and psychological needs of the elderly. The entrance should be built wheelchair pass ramp; hall and channel should be smooth and bright; stairs to facilitate the use of disabled; staircase in the form of slope, width should be appropriate, not too steep and too narrow; To facilitate the use of wheelchair and disabled persons. The location and height of items such as garbage, public passage lighting, fire room, milk box, letter box, etc. are convenient for the use of the disabled and the elderly. Find suitable for the elderly space environment design.

2.4.1. Design of communication environment for the elderly. For most of the elderly, hope to meet or talk through a sense of participation, make themselves feel and have not been abandoned by society. Inconvenience of action for the elderly, sat watching the activities of others is also a way to participate. In the public space environment design, for the elderly to provide the communication space can be divided into the following two categories:
Table 1. Elderly social environment design table.

| Elderly communicative environment | Small - scale communicatio n space | L-shaped seats for the elderly exchange. |
|-----------------------------------|-----------------------------------|----------------------------------------|
| Back to the building, walls or plant seats will make the elderly safe. |
| The relative seats are suitable for the elderly. |
| In the public space, the street-facing seats are more popular with the elderly. Community entrance, building entrance, road intersection, near the activities of the square is the place of communication between the elderly. |
| Group communicatio n space | The central area of public space is the largest place for the elderly in public space. Dynamic activity area with ball, boxing, dancing, boxing, jumping aerobics |
| Static activity area can use shade, flower rack, corridor and other space for the elderly in this wait and see, sun, chat, singing and other recreational activities. |
| The center area should be open, lively, for people to stay. The central activity area should be both time and public. It can be either an independent area or a public facility and a residential area near the green area. Consider the convenience of the elderly, while eliminating the negative impact of noise on the lives of residents. The activities of the elderly threat, interference factors to be promptly eliminated. |

2.4.2. Elderly fitness environment design.

1) A challenging and challenging environment

The barrier-free environment design can compensate for the loss of physical function of the elderly, but also should retain a modest incentive space to maintain and train the elderly surviving independent living ability. The role of this auxiliary environment is to enable the elderly with the necessary help facilities, to complete the challenging activities independently. This requires a certain understanding of the shortcomings of the physical movement of the elderly in order to find the appropriate auxiliary facilities to complete a higher level of activities. Continuing to provide the challenge to the elderly is to keep the elderly active and self-reliant, while eliminating their worries and the timidity of the challenge.

2) Elderly fitness environment facilities

Health and exercise are many of the concerns of the elderly, but also their main reason for the use of outdoor space. A survey in the United States found that the elderly's attention to health and wellness facilities is increasing, and walking or exercising is the most popular outdoor activity. In the public space, we should provide the elderly with a variety of outdoor space and activities. Whether it is indoors or outdoors, facilities and activities should be kept diverse, giving the elderly a choice.

3. Elderly ornamental environment design

Elderly in the leisure time often to the outside to the sun, breathe fresh air. For many elderly people, they are peace of mind, enjoy the leisure, close to nature when you can provide a variety of ornamental content. Lawn and garden area is the place where older people prefer. Green is a symbol of life, vibrant flowers and plants can eliminate the negative emotions of the elderly, so that the elderly experience the fun of life. At the same time, if conditions permit, the elderly can participate in planting and care, while enjoying the fun of labor creation, and this is itself an opportunity for entertainment and communication.

Horticultural planting areas should ensure adequate sunshine and water supply required for watering. In the vicinity of the residential units in the small garden of the most careable care, but have a good
management and guidance in order to achieve the effect of beautifying the public space environment. It should provide a raised area for the elderly with reduced mobility, preferably with several different heights, and leave a paddle area below to allow the elderly to approach.

3.1. Ground
The visual ability of the elderly fell faster, because the activities of the elderly cannot rely entirely on the visual. Under normal circumstances the following ways:

a) With the hand touch changes.
b) Change with the touch of the foot. Such as the intersection of the starting point, the end point, entrances and so on.
c) Help with sound.
d) With the sense of smell, air, temperature to judge.

Visual elderly people with a disabled need to have a ground mark on the ground. Linear ground marking should be used in the induction of ground material, indicating the direction of movement along the line; point-like ground mark should be used to suggest the ground material; on the way to temporarily stop or change direction, should be prompted to pay attention to the risk of height difference. In addition, the flooring of the color, material and other details of the changes can be prompted to reach the steps or traffic arteries.

3.2. Walkway
Most of the activities of the elderly in the day are done by walking. Elderly walking is sometimes for the purpose of necessity, and sometimes only for recreation and walking. Walking is a way more exercise for many elderly people, but pay attention to the safety of the elderly.

First of all, should ensure that the road is flat, to avoid a high degree of change, irregular bedding, the ground leaving a seam or other ground protrusions, which will threaten the safety of the elderly; followed by the floor material to ensure that the water is not slippery. Walking in the design, should strive to avoid a long and straight walking route. Meandering or changing roads can make the walking of the elderly more interesting, and curved roads can also help to reduce wind interference.

As the elderly visual and memory loss, the direction of judgment is poor, the best way to connect with each other to form a loop. In order to prevent the elderly lost or lost, in the road transition and the end should be set some markers to enhance the guiding. In the walkway, every 15 meters should be set up a seat for the poor health of the elderly to provide rest and chat places. The width of the walkway should ensure that two people pass side by side, or the width should ensure that a person and a wheelchair walk side by side, about 1.8m or so. Under normal circumstances should not be less than 2.5 meters. At the intersection of the road, the entrance of the neighborhood, and the sidewalk cut off by the edge of the stone should be set edge stone slope, the slope is generally 1: 12.

3.3. Ramp and steps
In order to facilitate the use of the elderly, in a highly changing place to set the steps and ramps at the same time. The slope used by the elderly should be smoother than the design criteria. The slope of the outdoor ramp should not be greater than 1/12, the width should not be less than 150cm, next to the anti-drop protection facilities.

3.4. Outdoor seating
Good recreational space design is the prerequisite for many activities of the elderly. The old man is not just outdoors in the outdoors, more in the outdoors, chatting the sun, watching and so on. So the old man sitting time is still more, therefore, to provide good rest space and location is very important. The seat position in the space is usually selected under the tree, under the corridor of the public building, near the entrance of the building, the intersection of the traffic flow lines in the district. Seat position should be
well ventilated, plenty of sunshine, but not in the tuyere. Outdoor sitting space to have continuity, for the elderly to provide a convenient rest, watch the Department. In the rest space, the elderly can listen to others, such as children playing, pedestrians, crowds, beautiful scenery, but also leisurely watch vivid and smooth visual effects. But the use of wooden seats in the outdoor poor durability, poor maintenance and easy to damage, so the actual operation of concrete and other hard materials made of. Seat size should be fully taken into account the characteristics of the elderly, the appropriate height between 30 ~ 45cm. The seat is too low for the elderly to take inconvenience, too high and uncomfortable. The width of the seat should be guaranteed between 40 ~ 60cm. For the elderly, the seat of the comfort and practicality is very important, the seat is easy to sit, but also comfortable to sit for a long time. At the same time, the seat should have a better match with the table to meet the needs of the elderly playing cards, playing chess and other activities.

3.5. Lighting
In the public space entrance and building entrance, and so on the flow distribution center should use high brightness lighting. Lighting should be set up near the area where people are often used to define the floor line of the floor. Lighting as far as possible using light down the lighting facilities, rather than light up or out of the lighting facilities to avoid glare.

3.6. Outdoor logo
Elderly people always feel at ease, always want to repeatedly confirm, therefore, and at each intersection must be set clear signs. For older wheelchair users, in the wheelchair cannot pass the road, to set the notice at the intersection. For the wheelchair can be used in the toilet, telephone, etc. should also be marked with a special sign out. For the elderly with visual disability, the need to voice, foot feel, feel and so on to guide. Amblyopia of the elderly is marked the text to be large and contrasting, easy to identify. Logo color should be more yellow, red and other warm colors.

4. Conclusions
In the next few decades, due to the improvement of quality of life, the requirements for the living environment has gradually increased. The number of elderly people in public space will increase, give full attention to the public space outdoor environment quality, for the elderly to provide a variety of environmental facilities have long-term significance.

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