

Exploration and Practice of Friendly Space Design for all Age Children in Urban Residential Areas

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Abstract: Building a child friendly city is an innovative practice of urban management, as well as a practice of modern urban civilization. The foundation of building a friendly space for all age children is the people's desire for a better life, which involves the growth and development of children. Based on the pilot practice in Xi'an, this paper analyzes the characteristics and problems in establishing a community suitable for the growth of all age children. It is hoped that in the future, space planning will pay more attention to activities specifically for children.

1. Introduction

In recent years, the concept of "child friendliness" has gradually attracted attention in China. Beijing, Changsha, Shenzhen and other cities proposed to build children friendly cities and began to actively try. Child friendly is a clear expression of "people-oriented". Urban residential areas play a positive role in child friendly. Child friendly urban planning includes space and facilities, such as parks, walking systems, community centers and playgrounds.

2. Research Background

2.1. Study Causes

In 1996, the United Nations Children's Fund (UNICEF) and UN Habitat formally proposed to integrate the basic needs of children into neighborhood or urban planning. The key words of child friendly cities are "children" and "friendly". Child friendly cities must include four main components: child friendly policies, friendly humanitarian services, friendly services and friendly environment.

Since UNICEF introduced the concept of a "child friendly" city, China has promulgated a "child friendly" city policy since 2006, with Beijing, Shenzhen and Shanghai as pilot projects for planning and construction. At the same time, it also reflects China's recognition and attention to building a "child friendly" city. With the acceleration of China's urbanization process and the improvement of

the requirements for the quality of life, parents pay special attention to whether children have a healthy and comfortable learning environment and safe and interesting learning space. Although our country builds cities according to the design principle of "people-oriented", the current investment in economy and technology is not enough to meet the construction standard of "child friendly city". Children are the future and hope of the city. Building a good environment for children is the benchmark to measure the objective performance of urban human construction and urban economic development. As the most vulnerable group of urban population, children should have the right to have more appropriate public space to reduce the safety risks in their growth. "Child friendly cities" design cities from the perspective of children and promote the planning of child friendly cities, which not only meet the needs of children in healthy and reasonable public space, but also meet the needs of different groups of people. At the same time, This is also an inevitable part of the trend of sustainable urban development [1].

2.2. Research Purpose

2.2.1. Promotion of "Child Friendly Cities"

Since the United Nations proposed to build "child friendly cities", many countries have started to build "child friendly cities", and China is also gradually exploring and developing. The proposal aims to reduce the number of obese, autistic and mentally handicapped children, prevent commercial spaces from infiltrating into children's outdoors, and prevent the safety risks associated with children and urban equipment. The Children's Urban Planning Guide: Children Friendly Cities proposed by UNICEF was published in English in May 2018. The guide focuses on children and recommends that children participate in its design so that children can live in a healthy, safe, green and prosperous society. It plays a leading role in urban planning to achieve the goal of sustainable development. Further accelerate the construction of "child friendly" cities.

2.2.2. Children's Outdoor Activity Space is Insufficient and Unattractive

In the city, the most common outdoor activity place for children is public space. In today's rapid development in China, the development of marketing is an inevitable trend, but the increase of various marketing spaces actually occupies children's activity space, reduces children's activity space, and cannot meet their spiritual needs. With the improvement of people's living standards, the number of cars is also increasing, which undoubtedly hinders children's action. In cities, as adults, consumers like visual effects, and only consider the purchasing spirit of consumers, not children, the elderly and the disabled, so children have little space for outdoor activities. At the same time, the social activity room is monotonous and inconvenient to use, resulting in many parents unwilling to bring their children to the public space of the city, thus reducing the amount of outdoor activities of children [2-3].

2.2.3. Growing Concern about the Increase in the Number of Children

In recent years, children often account for 25%~33% of the urban population. Due to the rich educational resources, many parents are gradually moving to cities to provide better education and medical conditions for their children, which undoubtedly increases the number of children living in cities. In order to enable children to run healthily, comfortably and freely, release their nature and develop their intelligence, building a child friendly public space in urban settlements is an urgent solution that must be taken very seriously.

3. Construction Practice of some Child Friendly Cities

3.1. Munich, Germany

Germany is a pioneer of child friendly cities in the world. It has formulated policies to protect children's rights and promote children's participation in urban construction. Munich is the most successful city in Germany to promote the concept of "child friendly city". Due to the high population density, the sharp increase in the number of immigrants, the establishment of the Munich Children's Agency and the appointment of the Commissioner for Children's Affairs, special attention has been paid to the formulation of policies and measures conducive to child friendly cities. Ensuring the well-being of children is the core of project decision-making at the municipal level [4-6].

3.2. Denver, USA

"Landscape research" provides more opportunities for children to contact with nature. Following Denver, several American states launched the Children and Youth Friendly Program (CYFC) in 2006 and launched a series of programs, making Denver the first child friendly city in the United States.

3.3. Tokyo, Japan

Based on a series of child friendly buildings and cities, the Japanese Institute of Architecture has improved and built an environment conducive to children's future growth and development, improved the environment and places used by children, formulated guidelines for protecting children's rights and promoting children's participation, and summarized some planning and design principles conducive to children's development. Based on this principle, Tokyo and its surrounding areas are committed to providing better facilities and services for children and providing them with an ideal and thoughtful growth environment [7].

3.4. Shenzhen, China

China's child friendly cities took the lead in launching in Shenzhen and translating their ideas into consensus. Through joint actions in the city, many cities across the country have achieved the same goal and accumulated valuable experience in global urban governance. Mother and baby rooms in public places, children's meetings and free distribution of "reading buds". From the perspective of children, urban development makes children an important role in the urban management system. It is not only an important aspect of modern urban development, but also the crystallization of urban attraction, vitality and innovation. As a kindergarten in Futian District, Shenzhen, Yihuang Baihua Kindergarten allows children to participate in the construction of the kindergarten from the perspective of "seeing the needs of children and listening to their voices". Children's Association is an important starting point for Shenzhen to explore children's participation in practice. In schools and communities, the views of some children were introduced and summarized at 119 local meetings, which eventually evolved into "hand in hand" with the participation of AFN representatives and NCCP members.

Yuanlin Street, Futian District, Shenzhen City - about 300 square meters of green space will be transformed into a "thriving happy farm". Flowers bloom in the flowerpot, bees and butterflies fly. In the corner of the flowerpot are insect houses built by children; After repair, the stone chair was carefully ground into a circle; The zebra crossing in front of the school is also painted as a rainbow

zebra crossing. This is the collective wisdom of more than 200 children. Small designers participate in site selection and garden construction, combining natural education, scientific observation, environmental protection and environmental protection. As shown in Figure 1 [8-9].



Figure 1: Shenzhen "Child Friendly City" Sample

4. The Present Situation and Existing Problems of Outdoor Activity Space in Urban Residential Areas -- A Case Study of Xi'an

4.1. Limited Space Requirements

Research shows that children's outdoor activity areas are not considered in the early stage of the old city. The total area of outdoor activity areas is very small, and even many areas have public areas for adults and children. The overall structure is unreasonable. The space is not humanized enough. There is less buffer space for taking care of parents and children, and the overall activities are limited. In addition, many venues use flower beds, drop stages, etc. It not only limits the children's desire to explore the outside world, but also brings great inconvenience to the baby carriage users.

4.2. Equipment Safety Risks

During the re investigation, the author found that the quality control of the equipment in the previous facilities from size to material was weak, and there was no safety mechanism to detect, so there were some safety risks. The early design of the amusement park is unreasonable. The detailed design of children's rock climbing and the lack of safety fences in the upper area and the slope edge endanger the safety of children.

4.3. No Theme Concept, Unified Equipment

Most communities install only one large combined device or several smaller individual devices. According to various facilities, games on the playground cannot provide children with interesting multidimensional space, so they can experience spontaneous activities with little participation.

4.4. Monochrome Plastic, Poor Drainage Capacity

The survey shows that the plastic color and exterior pattern combination of the early community are relatively uniform, without considering the proper drainage requirements of the site, while the plastic color system of the site shows low saturation and low recognition. Few interesting paintings

and works ignore the real psychological needs of children [10-12].

4.5. Lack of Interaction after the Epidemic

Research shows that after the outbreak of the epidemic, parents will pay more attention to the health and safety of children's activities, and more parents prefer to use natural space for light and heavy interactive equipment. The early design process did not analyze these problems, but looked at them from the perspective of contemporary and design thinking, which limited children's emotional interaction and cognitive ability in the game, as well as their low participation.

5. Multi-dimensional Innovative Ideas on the Design of Friendly Space for all Age Children in Urban Residential Areas

The design of children's playgrounds is not only intended to provide children with interesting playgrounds in the community landscape, but also to let children experience and develop further actions. Before developing the program, consciously improve the child's initial space. From the perspective of children, the playground can create a community atmosphere for middle-aged children. Considering the style, sense of space, children's health and safety and other factors, highly interactive lights and the natural experience of emotional interaction between neighbors, as well as the establishment of common emotional ties. By understanding children's real needs through friendly and humanized innovative design theory, we can create humanized works that truly conform to children's nature.

5.1. Health and Safety

With the continuous development of the industry, the layout of children's rooms should take into account the positive behavior of children, and the site design should ensure the safety of children's activities; Floor materials shall be smooth, anti-skid, durable, safe and non-toxic; Accommodation arrangements between facilities should take into account adequate safety distance to ensure the safety of children in interactive games. Higher industry standards are needed to control various materials, from safe to safe materials, better standards to meet the requirements of the current market, and stronger detection mechanisms to ensure the safe use of children [13].

5.2. Close to Nature

In the context of lack of natural environment and rapid urban development, integration of natural space design has gradually become a trend. The design of natural plots includes not only the natural regression within the plots, but also the possibility of natural activities in the process of plot design, as well as the introduction of more advanced natural plot design directions such as cognitive botanical gardens, dry streams and rain gardens. The website design can combine the location function with the historical theme line, define two or different terrain shapes, change the proportion between the size and difference accordingly, and finally become an interesting functional website. The wooden tree house is a semi personal space, which can meet the psychological needs of children hiding in their own small area, give them an exciting sense of experience, and teach them communication and thinking skills to get out of the comfort zone; The balance beam not only tests children's ability to coordinate their limbs in an interesting way, but also increases their learning methods; Bamboo Tunnel - to rebuild the most primitive habitat, so that children can understand the life of cave animals; Bamboo forests, bushes and caves are places where you can experience privacy, environment and detour; Hydrophilicity is the nature of children. Different types of

waterscape meet the needs of children of different ages. They use their bodies to directly contact with nature and experience the beauty of nature; The children walked on the paved path, lay in the sand pit, lay on the grass and looked at butterflies, sat on the dead tree, and rested with their parents. Their partners built tents with branches. All these activities are integrated into nature, experience the most ecological and wild natural parks, stimulate children's imagination, improve practical skills, communication and cooperation. This is important for children's development. This method of using nature to create public game space is a design method worth exploring and applying in China's "child friendly" urban environment to create public space [14]. As shown in Figure 2.



Figure 2: Children's Park

5.3. Educational Issues

More and more parents pay attention to their children and hope that they can grow up in the game. Designers should provide more communication and interaction opportunities in space design to improve children's social skills, voice communication skills, courage and risk management skills. It can also create new experiences so that children can play games on the playground, combine imagination with parents' interaction, teach in fun, and stimulate children's imagination with unlimited creativity.

6. Optimal Design of Qujiang New District in Xi'an from the Perspective of Children Friendly

Qujiang New Area is located in the southeast of Xi'an and east of Yanta District. It is an important part of Xi'an's "five districts, one port and two bases". The use developed by the Group has the characteristics of "nine palaces layout, grid street network, prominent central axis, and multi center city". The research object of "Qujiang New Area Phase I" is located in the northwest of Qujiang New Area, north of Yingxi Road, South Yanxiang Road, East Yanxiang Road and West Jinhua Road, with a total area of 15.88 square kilometers [15].

6.1. Current situation of children friendly space in Qujiang New Area

In Qujiang New Area, high-rise buildings constitute the largest proportion of residential areas in the first phase. In terms of educational land, there were relatively few educational institutions in Qujiang New Area in the past. In the past two years, some new schools have been built and more appropriate educational institutions have been established. These institutions can meet the needs of students in nearby communities to a large extent. Most of these schools are key schools in Xi'an,

such as Qujiang Middle School, the Affiliated Middle School of Shaanxi Normal University, Qujiang Middle School, and Qujiang No. 2 Middle School. Educational institutions and teaching quality are only a small part of them. The district has become a relatively rich educational resource in Xi'an. In terms of cultural and entertainment space, the main cultural facilities include Qujiang Concert Hall, Qujiang Art Museum, Qujiang Ocean Polar Park, etc. The service level is high, and the service object is oriented to the city. However, there is a serious shortage of public cultural facilities, such as entertainment centers, libraries and archives, accessible children's entertainment centers, and large sports grounds and centers. In general, the first level of other child friendly spaces in Qujiang New Area is based on the qualitative distribution of living space. The distribution of space and facilities presents a general trend of concentration. High quality rooms and facilities are mainly concentrated in the northwest, middle and south of the region. In addition, in the green ecological parks, the quality of northeast and north is later. The urban street classification of Qujiang New Area is shown in Table 1.

Table 1: Classification of Urban Streets in Qujiang New Area

Area classification	Type of living space	Educational facilities	Representative streets
Zone A of Yanta	Family home and early developed community	Middle School Affiliated to Shaanxi Normal University	Commercial land - Dayan Pagoda, Ci'en West Road and Ci'en Road (branch road)
Park Area B	High grade residential area	Qujiang Nanhu Primary School	Park land Qujiangchi West Road
Amusement Zone C	Medium and high grade new community	Qujiang No.1 Primary School Branch	Land for recreational facilities - North Chilou 1st Road, Ocean Park

6.2. Measures to Optimize Child Centered Urban Space

First, optimize the traffic space through traffic management and planning, turn the street passage from the direction of cars to the direction of people, and provide continuous and independent mobile space for children to create a safe and uninterrupted mobile network. Strengthen traffic management, create a highly safe travel environment for children, and ensure a safe, interesting and comfortable travel experience. Identify different usage patterns at different times. Vehicles can be parked along streets and multi-storey parking lots at night. Urban road construction should fully reflect child care. Second, use separator strips, road extension strips, etc. Reduce children's distance on the road. In order to better avoid children crossing the street, as shown in Figure 3, priority parking spaces should also be set at about 2.4 meters in front of the sidewalk. At the same time, dotted lines or parallel panels can also be replaced by materials of different colors, or attractive shapes such as zebras and trapezoids can be used to highlight changes, so as to better visually identify the space where children cross the street and make the room safer for children. As shown in Figure 4.



Figure 3: Schematic diagram of children friendly city crossing



Figure 4: Colored zebra crossing

6.3. Practical Conclusion

Based on the design of child friendly public space, this study summarized the content and characteristics of child friendly public space design, and made a field visit to Qujiang New Area in Xi'an by using excellent foreign design examples. In the study of design improvement, the following conclusions and conclusions are drawn: (1) based on relevant theoretical research, the importance of children as the main object of public space is analyzed, and the content of child friendly public space design is summarized. It includes three aspects of architectural space, ecological landscape and infrastructure, and summarizes the characteristics of child friendly public space. Special emphasis is placed on the elements of natural design theory and child friendly public space assessment. (2) On the basis of the theoretical study of child friendly community space, field investigation and community case study were conducted. This paper analyzes the main problems related to nature in urban public space from the perspective of children's use of urban public space, including the nature of community, children's community activities, nature and children's friendliness, and discusses the target project with excellent design examples at home and abroad.

7. Conclusions

In short, community entertainment spaces designed for children of all ages have become an important way to develop children's social, emotional and cognitive abilities. Only from the perspective of children, through friendly and humanized design theory, understand the real needs of children, and innovate in landscape design, can we design humanized works that truly conform to children's nature. This paper aims to create an exclusive living space for children of all ages through research results, and create a more humane and warm community with wisdom.

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