



## Research on facility design strategy of modern urban outdoor children's paradise

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### Abstract

As the construction of child-friendly city has become the development goal of many cities, people have put forward new requirements for the design of urban outdoor children's paradise, and children's facilities are the key to the design of urban outdoor children's paradise. Based on the deficiencies and main influencing factors of urban outdoor children's paradise facilities, this paper puts forward relevant design strategies from the aspects of shape, type, material and color of facilities combined with specific examples, so as to provide a certain reference for building an urban outdoor children's paradise with interest, curiosity, challenge and exploration.

**Keywords:** landscape architecture, outdoor children's playground, children's facilities

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### 1. Introduction

Children are the future of the society, and the degree of child protection and care in the society reflects the civilization and development level of the society. According to the seventh national population census in 2020, there were 253.38 million children aged 0-14 years old, accounting for 17.95% of the total, a year-on-year increase of 1.35% compared with the census data in 2010. This has a great relationship with favorable national policies and social and economic development, which is conducive to cope with the severe problems such as population aging that China is currently facing.

In order to create a healthy, beautiful and happy environment for children's education, growth and development in modern cities, the United Nations put forward the concept of "Child-friendly city" (CFC) for the first time at the Second Conference on Urban and Rural Human Settlements in 1996 <sup>[1]</sup>. The design of outdoor children's parks in cities has attracted much attention and become a key field of public policies. The purpose of building urban outdoor children's paradise is to encourage children to explore the world and develop their personal abilities. The amusement facilities based on the research results of pedagogy and psychology have become the core of children's activity places.

From history, the western countries after several iterative development, the study of urban children playground facilities design tend to be more mature and perfect, since the 1940 s instrument has moved towards a simple game for multivariate function of power facilities, and start with the perspective of children to the safety of facilities design, entertaining, challenging, and on the development of children's body and mind, The intention is to make more breakthroughs in many aspects such as shape, function and technology. China started the construction of special children's parks in the 1950s. The research on children's park facilities is relatively late, and the research results are limited. It is difficult to meet the demand for children's park facilities in the background of rapid urbanization. At present, China's 14th Five-Year Plan Outlines the construction of "child-friendly cities" (CFC) for the first time, specifying that the construction of child-friendly cities will be promoted in 100 cities in the next five years. In China, many cities such as Beijing, Shanghai, Guangzhou, Shenzhen, Chongqing, Zhuhai and Changsha have proposed to build child-friendly cities and started a series of active exploration of outdoor children's playground facilities, forming rich practical experience.

## 2. Currently the existing problems in the design of children's park facilities in China

People in modern city level rising and ideological concept, under the trend of gradual transformation of today's parents hope to create a more friendly living environment for children, willing to spend time and energy to accompany the children happy and healthy growth, for children to build a sweet and happy childhood, the higher request to the design of urban outdoor children's playground. In order to let children fully experience nature and enjoy the fun of games, the design of outdoor children's paradise facilities in various cities has become a particularly important link <sup>[2]</sup>. At present, the facilities of children's paradise mainly have the following deficiencies.

### 2.1 Lack of appeal to children, not as much as the temptation of electronic products to children

The rapid development of modern science and technology not only creates a convenient life for people, but also brings many problems. As media and the Internet penetrate into daily life, many children are addicted to electronic products, which not only neglect their studies, but also lead to sedentary bodies without proper exercise. Parents and educators are concerned, and calls for more outdoor play time, programs and activities are growing. It has been observed that children rely on electronic products mainly because they can constantly stimulate the brain, bring children novel and changeable sensory experience, occupy children's long-term attention. But the amusement facilities in many places are often the same and no new ideas, the foundation amusement facilities slide, sand pit, swing and other modeling is simple and single, which leads to children's sensory fatigue, lose interest in play. Therefore, only by increasing the attraction of outdoor children's amusement facilities in urban areas and stimulating children's interest in amusement facilities can children be helped to stay away from the Internet and get closer to nature <sup>[3]</sup>.

### 2.2. Simple play leads to poor education

Since the construction of child-friendly city, outdoor children's paradise has been widely paid attention to, but there have also been some bottlenecks. Most public places are simply marked out as a place for children's activities, and some recreational facilities are placed for children to do some recreational activities. The traditional and boring model of "field + play facility" seems to have become the usual means of outdoor children's playground design, while ignoring the diversity and participation of children's play. Common trampoline combination facilities help children strengthen sports exercise, only to meet the physical health of children, but ignore the development of children's psychological quality. A simple play does not go deep into the psychological education of children, exposing the moral of the amusement facilities is not strong. In order to provide a more beneficial environment for children's future development, the lack of professionalism, innovation ability and educational function, research and exploration of amusement facilities and other problems need to be improved.

### 2.3 The quality of facilities needs to be improved

In today's society, children's amusement facilities, as one of the most important entertainment items, not only affect People's Daily life, but also directly affect children's sensory

experience and health and safety. The common amusement facilities materials are mostly rubber, plastic, etc., but due to the late start of the amusement facilities research in China, the quality of professional facilities testing personnel is uneven and the ability of relatively backward, which leads to the low quality selection standards of facilities materials, and there are many hidden problems in all aspects. In addition, the selection of facility materials is subjective and low in availability, which is not easy to meet children's five senses of unknown exploration experience.

### 2.4. Ignore the aesthetic influence of visual experience on future children

In the process of daily use of amusement facilities, children's aesthetic perception, aesthetic imagination, aesthetic emotion and other specific contents are actively stimulated, and aesthetic psychology is gradually formed. Therefore, amusement facilities play an important role in the cultivation and positive guidance of children's aesthetics. However, at present our country rides in the early period of the manufacturing design few professional visual designers, so all sorts of flamboyant color, the color is not harmonious amusement facilities around, the color pollution caused by lower our overall amusement facilities not only beautiful, in the natural conditions of the activities are to be out of tune and the surrounding environment, affect children's physical and mental health.

## 3. Design strategies for children's Playground facilities

According to the research, there are three types of children's play experience in outdoor children's play places: sensory experience, judgment experience and social interaction experience; Among them, sensory experience is based on sensory pleasure, judgment experience is based on children's knowledge, and social interaction experience is based on the pursuit of interaction. Among them, amusement facilities are the main influencing factors in children's amusement experience. In order to give children better growth experience, combined with the above existing problems, the following design strategies are proposed.

### 3.1 Create an intimate sense of fun facilities

When children's activity space contains similar elements of things or storylines that they are familiar with before, they can spontaneously form fictional thoughts in their minds and combine them with the real space, so as to conceive a happy mixture of situations and Spaces, and they are more willing to use the language and facilities of play to start communicating. Therefore, in order to make children adopt amusement facilities faster and have good interaction with them, the concretization of existing forms is often selected in the shape design of facilities.

Representation is the direct simulation of things, but it differs from realism, not completely copy of reality, is not only to the original form completely copy, but to simplify the shape of things, on the basis of the original scope of deformation, the cartoon vivid, increase its interest and the imagination of children. Usually in natural scene and artificial scene to create a full of imagination and affinity, form the corresponding facilities should also be the scene visible object, can let the children in the role of the unconscious and scene together, through a specific cartoon image design train of thought, to break the stereotype of objects prototype children, let children produce novelty, increase attraction,

Produce intimacy, and satisfy the nature of children. In order to promote the development of children's imagination and creativity, irregular points, lines and planes are often used to shape the facilities of cartoon form, and the concrete form is abstracted. Since children have a shallow understanding of abstract modeling, the modeling of facilities

should meet the characteristics of simplicity, roundness and compactness. Roundness and firmness can give children more sense of security and intimacy, and simplicity can help children to improve their ability to form a basic sense of design.



Source: <https://moool.com>

**Fig 1:** Outdoor Children's Facilities of "Xinli · Turning Cocoon into Butterfly" in Guangdong

Intimate facility shape can also be combined with popular science education, edutainment. The "Xinli. Cocoon into Butterfly" outdoor educational park in Guangdong has cartoonized the basic image archetypes of eggs, caterpillars, cocoons and butterflies in the four stages of the butterfly's growth trajectory, creating corresponding facility shapes and applicable to various game functions. The transformation from cocoon to butterfly is originally a process of change and development, but the concrete facilities allow this process to be visualized, attracting children to stimulate their imagination in familiar things, and observe the connection of things and the charm of nature. From caterpillar to butterfly evolution to feel the success behind the unremitting efforts and persistence; After the butterfly's life disappears after laying eggs, I can learn to be grateful and learn good virtues such as respect for elders and filial piety to parents. I can generate self-cognition and receive education in play (see Figure 1). The whole design echoes the theme of the scene, but also adds fun to the facilities and brings inspiration to children.

### 3.2 Diversification facilities are designed to develop children's abilities

Games occupy most of children's time, and they are the best way for children to explore the world and improve their abilities. Through the addition of game elements, emphasize the scientific setting of children's activity places, so that children can master scientific knowledge in the outdoor activity environment. Through the diversified setting of amusement facilities, the educational effect of the environment will be maximized, the positive interaction between children and facilities will be achieved, and the children will be encouraged and guided to participate in activities actively, relaxed and independently, so as to get enlightenment.

Climbing facilities provide children with a strong challenge. Climb the objects of distance and the vertical height from the line of sight Angle change constantly, make children in each to a place to another in a new environment, will form a new space feeling on the vision and the three-dimensional face, helps children develop the overall concept of space, inspired children overall Angle viewing environment to new things. The various skills of climbing exercise for children can

quickly promote the training of their high coordination to the body structure, so that the training of their body posture is more flexible, more flexible reaction force. Some of the motor skills practiced during climbing activities also have great positive benefits in terms of promoting bone development in their bodies. Climbing facilities can lead children to explore the environment, cultivate their independent exploration ability and satisfy their curiosity. Gliding facilities help children develop their balance. Children glide in the air when training can personal experienced two different positions of sliding speed and experience, promote the children their sport tactile coordination development, develop your independence to the action and coordination ability, enhance children's physical control of the reaction force, but also satisfy the children's demand for space feeling, from the ground to the sky, and then to the ground this dynamic experience. Usually, gliding amusement facilities can only be used for solo entertainment. In the process of waiting in line, children's patience and literacy can be cultivated and the good habit of obeying the rules can be formed.

Facility sports such as jumping and running can enhance children's consciousness of movement, exercise children's limbs, and increase muscle strength. In the process of exercise, children can enhance the function of respiratory organs, promote the good development of nervous system, enhance immunity and physical toughness, and help children focus. Jumping and running facilities can also play a certain role in promoting the shaping of children's character, improve children's confidence and courage, relieve children's anxiety and pressure, and make them more healthy physically and mentally.

Art facilities improve children's artistic literacy through vision, hearing and touch, cultivate children's aesthetic cognitive ability, and increase children's common sense of life. Art facilities can not only improve children's observation and imagination ability, but also give children a positive emotional outlet, so that they have the courage to express, to create, to break through, to innovate.

Rocking facilities can exercise children's body balance, as far as possible to reduce the negative obstacles of motion sickness, seasickness. Children muscle in the process of carry on some physiological movement, skeletal muscle

contraction will then have a circadian rhythms to get loose and cramp to relax, to keep children good body muscles and healthy development, in the psychological sense, can help children overcome nervous fear of psychological mood, improve self-control and mental endurance.

All the above facilities have positive effects on the physical and mental development of children. In the recreation, children's thinking ability, verbal description ability and co-creation ability can be fully experienced and improved.



Source: <https://moool.com>

**Fig 2:** Facilities of "Poly AVIC Sky City" Children's Playground

With the rapid development of cities, technology is gradually integrated into the design of facilities. In order to cultivate children's courage and challenge, the "Poly AVIC Sky City" children's park in Chengdu has built a variety of facilities such as climbing, rocking, sliding, running and jumping, and the rocket is chosen as the symbol of the park to encourage children to go forward and explore the future actively. Use light and electricity to make the facility more interesting: for example, children can use sound to control the light to reach the top of a rocket, just like a rocket launch (see Figure 2). On the basis of the original type of facilities, the scientific and technological facilities are more intelligent, which further improves the efficiency of the diversified facilities, brings rich experience and impact to children, and better cultivates children's various abilities.

### 3.3 Material selection affects children's vision and touch

Urban outdoor children's park facilities can give children direct sensory experience, and the appropriate performance

of amusement facilities can increase children's experience comfort. Therefore, the material selection of facilities plays a particularly important role, which directly affects the psychological and physical feelings of children in the process of using and playing. Since children will have sufficient contact with amusement facilities in the process of playing, the safety and touch sense of the material selection of the facilities are particularly important. Different thickness, soft and hard degrees and diverse materials can be set so that children can feel objects through touch, so as to improve the ability of discrimination and perception. From the point of view of safety, the material should be non-toxic and harmless, solid, dirty resistance, heat resistance, cold resistance and so on. The environmental protection of materials also needs to be focused on, which can not only save energy and resources, but also reduce large safety risks and strengthen the protection of children. In addition, the choice of material should also echo the shape and function of its facilities to make the overall facilities more harmonious <sup>[4]</sup>.



Source: <https://moool.com>

**Fig 3:** Vanke-children playing sandpit

With the rise of participatory design, some designers are getting users involved in their projects. Different from others, in addition to strictly controlling the basic requirements for the use of facility materials such as nature, environmental protection and safety, Vanke Construction and Research

Center puts forward ideas and schemes for the future construction of the facility model by observing children's different material design techniques and actual use of materials in the same play facility template. For example, in the sandpit experiment module, five common sandpit

materials, namely yellow sand, white sand, black pebbles, wood chips and fine soft gravel, are used to conduct simulation experiments and make comparative observation to see which materials children are more willing to play on (see Figure 3). Through the combination design of a variety of high quality materials, to explore better answers in actual use, is conducive to promote the exploration of urban outdoor children's paradise facilities design.

### 3.4 Rich color collocation adds fun to the facilities

With the progress of society and economy, people turn from "practical" to pursue "aesthetic", which reflects our rapid development. Jiang Xun, a famous artist, once said, "A person's level of aesthetics determines his basic competitiveness in society. Because aesthetic level not only represents the individual's view of the big picture, but also represents the subtle observation. The best gift you can give your child is to develop his aesthetic abilities." It is an indispensable link in education to sow the seed of aesthetic appreciation in children's heart through every bit of life and let the cultivation of aesthetic appreciation penetrate into all aspects. As an entertainment carrier for children's daily use, outdoor children's playground facilities play an important role in the enlightenment of children's aesthetic and color sensitive period, and its aesthetic design has become a link that cannot be ignored.

When children begin to contact cognitive facilities, the first

thing is to use the eyes to observe. A variety of color layers will bring him a strong visual impact. Starting from the psychological characteristics of children, bright and rich colors can bring children a happy and relaxed mood, enhance the sense of fun experience. High saturation, high purity color can stimulate children's interest in games, but long-term gaze will also cause visual fatigue, harm to vision. So, choose downy and pure color as the main color generally.

Coordinated color collocation can add fun to facilities, and excellent color scheme design can not only meet children's visual needs, but also lay a foundation for children's good aesthetics. In the choice of color, color should not be too much, too jumbled color is easy to distract the attention of children, and color must have the primary and secondary points, there must be a certain proportion between all kinds of colors, and the component is not equal. Generally choose one or two colors as the main, three colors as auxiliary. It is a common design method to use color contrast to match children's amusement facilities. Contrasting colors and complementary colors are selected for collocation. Among them, complementary color has the great difference of warm and cold, is the most intense contrast. However, we should also pay attention to the degree of color coordination, can be changed by changing the proportion between the contrast color or complementary color, to ease the strong contrast relationship of color, so that the overall color harmony.



Source: wechat official account Luojia Children

Fig 4: Wuhan "Maya Water Children's Park" facilities

Wuhan "Maya Water Park" facilities use brown as the main color, orange and green as the auxiliary color. Change color lightness, saturation and so on obtaining a light brown, brown, dark brown to build scene facilities such as colorific administrative levels and coordination, and use the orange and green color to jump to add the colour of activity and interesting, the selection of the color saturation is low, as if the scene in one thousand, the ancient Maya, everywhere reveal the traces of the Maya civilization vanished, Nature is substituted for an adventure (see Figure 4). So. The rich color collocation not only brings children a fresh and interesting sense of impact and imagination visually, but also combines with the theme of the park, the shape of the facilities and the surrounding environment to create a natural, vivid and fresh scene.

### 4. Conclusion

Outdoor children's amusement facilities should not only have

enough attraction, diversified functionality, reliable safety and overall aesthetics, but also inspire children to better integrate into the environment and collective, comprehensive quality and all-round development. At the same time, proper repair and management should be carried out according to the characteristics of the amusement facilities. The construction of outdoor children's amusement facilities is strengthened by creating fun facilities with intimacy, integrating modern technology into diversified facilities, actively exploring the better choice of materials and matching rich and coordinated colors, so as to meet children's fun, curiosity, challenge and exploration. Bring them a far away from the virtual environment, no limitations, comfortable and beautiful growth environment.

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