

Analysis on the Space Design of Children's Outdoor Activities in Urban Residential Areas in China

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Abstract—Based on the definition of children's outdoor activities in residential areas, the relationship between residential areas and children's outdoor activities and the significance of outdoor activities to children are summarized. Problem-oriented, it clarifies the deficiencies in children's outdoor activity space design at the present stage, and reconsiders their real needs for outdoor activity space from the perspective of children. This paper summarizes the relevant theoretical research on the outdoor activity space of children in residential areas at present, and analyzes the design methods from the perspectives of site design, green design, recreation and architectural sketch design, in order to provide useful enlightenment and guidance for relevant theoretical research and design practice.

Keywords—residential area; children; outdoor activities; space design

I. INTRODUCTION

A. Definition of Children's Outdoor Activity Space in Residential Areas

The definition of a residential area is that the city is surrounded by the main roads or natural boundaries of the city, and it is relatively complete and relatively independent of the public service facilities needed to meet the material

and cultural life of the residents of the area. Living area inhabited. The children's outdoor activity space in the residential area is a public open space specially designed for children. It is the easiest place for children to get involved. It has the functions of gathering, playing, science, rest and so on. It is also a place for parents to communicate with each other.

B. Relationship Between Children's Outdoor Activity Space and Urban Living Area

For children living in the city, there is a considerable amount of outdoor space in the city that resembles a city square. They are loved by them because the children's initial thoughts and feelings are tangible with the environment around them [1]. These outdoor children's activity spaces have become an important part of their intellectual and physical development, and the outdoor activities that are most closely related to children are present in the residential areas where they live daily.

With the renewal and iteration of urban residential areas, the spatial pattern of children's outdoor activities in traditional residential areas should be innovative and developed. As the main body of the city, the residential area should not only satisfy people's most basic living needs, but should also pay attention to diversified development. The

children's outdoor activity space is part of the residential area, and its innovative development model will also lead to the overall improvement of the residential environment, and even to the overall development of the city.

C. Significance of Children's Outdoor Space Design in Urban Residential Areas

1) *Benefits of outdoor games:* Children's feelings of outdoor activities are different from those of indoor activities. Of course, the way of outdoor games is different from indoor games, and outdoor games can promote the healthy development of children [2] [3]. In a flat and wide field, children can create more game forms, so that the exclusive venue allows children to play without any restrictions [4].

From different angles, scholars have continuously demonstrated that children's outdoor activities can promote their physical and mental development compared with indoor activities alone. For example, Davies [5] mentions that outdoor activities can give children more opportunities to engage in free activities, and can also take advantage of natural and unnatural factors in the field, which is more conducive to children's athletic ability and intellectual development. Shim, Herwig, and Shelly [6] have observed and recorded several relatively low spatial development environments compared to ordinary space, and found that younger children play more diverse games in outdoor activities, such as role-playing games. Hartle's [7] study shows that children's outdoor activity spaces are more likely to inspire innovation. Children's game behaviors in outdoor activity space can be studied from two aspects: on the one hand, the differences of children's game behaviors in different types of game space can be compared; on the other hand, the performance of children's interaction with various amusement facilities and the characteristics of the site itself can be analyzed [8].

2) *The necessity of outdoor game space:* With the continuous development of the city, the natural children's outdoor activity space in the past with the natural environment has been gradually eroded by industrial development. Later, more and more urban high-rise buildings were built. Due to the relationship between land use and cost, a large number of dense In the form of residential areas, as the number of vehicles increases, the former blocks are no longer safe, so the existence of children's outdoor activities space needs to be updated.

Foreign studies show that the construction of activity sites has a certain impact on children's outdoor sports and communication ability. For example, some scholars have observed that young children's outdoor free activities generate more movement behaviors than indoor and purposeful space [8]. The components of the outdoor activity space, such as equipment and facilities, have a certain guiding effect on children's athletic ability and communication ability [9].

Therefore, some scholars began to observe children's game behavior, understand children's game needs, and on this basis design a high quality playground. Frost [3] believes

that younger children mainly perform physical exercise and construct games, which shows that the game equipment in the venue is the main factor of design. In Betsy's [10] view, better children's outdoor activity space should minimize artificial design, let children explore the site from their perspective, and describe such space as "providing freedom in the fence". Given the child's hands-on ability and potential for creation, tools for children to move should be provided in the venue for temporary structural design. Older children can also do some adventurous activities, such as climbing trees.

3) *The natural nature of the game space:* Through a large number of theoretical studies and field observations, foreign scholars have found that natural space settings can make people stop and use more frequently[11], so the "natural environment" has become an important environmental feature. Studies have shown that children prefer an unstructured environment [12], and the natural environment can provide children with more independence and mobility [13]. Children also showed more preference for the design of natural elements in the field. "Rock climbing is more fun than climbing trees, but climbing trees is far more interesting than monotonous gaming devices," says a preschooler. This gives us an idea of how children see traditional playgrounds and their love of the natural gaming environment [14].

The natural playground environment has a better developmental effect on children. When Taylor et al. [15] visited the outdoor public space of urban public green space, it was found that the children's game behavior and communication ability in open hard space activities were slightly worse than those in green space activities, which may be due to the hard space of the green space. More, plants, soil, etc. have a certain role in the exploration of children's creativity. Shim and Debord [16] found that in natural venues, children engage in more innovative construction games than more repetitive games. In addition, Francis [17] believes that in a less human intervention environment, children can maximize the space of contact with nature, and the children's curiosity and creativity can be fully released.

D. Insufficient Design of Children's Outdoor Space in Urban Residential Areas

Everything has two sides. In addition to being able to bring some positive influences to children, outdoor games in residential areas are accompanied by some negative effects. The impact is on the quality of the game itself. Foreign scholars have found in the actual argument that outdoor activity space can promote children's growth [9]. When the quality of the game is not normal enough, the negative impact of the activities in the venue will increase accordingly.

Comparing the traditional and modern game venues, there will be more competitive behaviors and less cooperative behaviors in the traditional game venues. The reason is that the quantity and form of equipment are small or single, which cannot provide children with creative games [9]. Although the modern game venues are equipped with a

combination of equipment and facilities, they are slightly better in function. However, in all aspects, the design of the playground that mostly focuses on the accumulation of equipment is still inadequate [18].

Although no matter what form of entertainment equipment can create a certain value of the game, we should pay more attention to the characteristics of the venue rather than the specific facilities in the venue. Therefore, more and more scholars are beginning to pay attention to the characteristics of the site, such as whether the per capita space is sufficient [19], whether the spatial structure is reasonable [20], and whether the type and structure of the fixed device is humanized [21]. Whether the degree of challenge, novelty, and complexity is appropriate [22], the existence of private space [23], the usability of mobile materials or scattered parts [24], etc. Entertainment equipment, practical materials, the challenges of children of all ages, and the opportunity to offer different experiences are all factors that drive high-level games.

E. Children's Own Design Needs for Outdoor Activities Space

Before discussing the construction of children's outdoor activity space design in urban residential areas, we should first recognize what children want. The author summarizes the following through literature research method and field investigation method.

1) *Close interaction with nature:* Children want to feel the air, the sun and the vibrant land. They need to be treated with sincerity, whether it is the colorful four seasons or the changing weather, or the carefully designed bright game facilities and the different textures presented. Things, they all want to see the most authentic natural world;

2) *Unusual structures:* It's not that you have to design a structure that is tall and expensive. It is to say how to design some of the more unique, just like children's favorite structure. Perhaps these structures will be rough and simple, but they will give them unique meaning or fun after careful design by the designer;

3) *Transparent space:* Transparent space means that in the wide open space designed by the designer, different people will enter the same space and their activities. From their psychological level, it is rare to enjoy any piece of it alone. Space, but inevitably will want to have that part of the world that belongs to you. The crowd will disappear after the outdoor activity space game and then disappear, and the space will have elastic changes, and this change is the process in which the space is repeatedly filled and emptied;

4) *The domain of the individual:* Today's children are in an era of relatively perfect education system. Their intellectual development is more and more mature, so they are more and more independent and farther away from the natural environment. If the children in this background can have their own outdoor activities, seeing the real animals in front of the eyes, not just in the cartoon, they can use their little hands to play with the dirt on the sun-drenched land.

The natural changes in the surroundings will be enjoyed all the time. Such beautiful pictures will be preserved forever in their memories, and in the mind will also have their own independent regions and self-trajectories.

Children are the main body of outdoor activities in residential areas. At present or in the previous period, designers tend to be subjective and too active, ignoring their own feelings and needs, and rarely designing from the perspective of children. Under the coordinates of the new era, urban construction is maturing and rational, residential areas are increasingly scientific and intelligent, and children's outdoor activities in urban residential areas need innovative development.

II. THEORETICAL STUDY ON THE DESIGN OF CHILDREN'S OUTDOOR ACTIVITY SPACE IN URBAN RESIDENTIAL AREAS

A. Six Factors Affecting the Spatial Planning and Design of Children's Outdoor Activities

The key to the design of children's outdoor activities space is whether the designer is looking at the child's point of view, considering the children's perspective, and looking at the entire design site at their height. If the designer starts from such a perspective, then the child's multi-faceted development needs will be met. This paper discusses the construction of children's outdoor activity space design in urban residential areas. The author summarizes the following six factors that need attention.

1) *To meet the needs of children themselves:* Children are the main subject of outdoor children's activity space in residential areas. At the beginning of design, the psychological and physiological conditions of children of different ages need to be mastered. Children's own activities are unconscious, all instinctive, and the process of playing games in space itself allows them to perceive the world in a relatively relaxed environment, which is a process of growth. Designers need to mobilize their rich imagination to introduce recognizable content into space naturally, and then guide children's understanding of "growth".

2) *Building an interactive space for emotional memory:* The emotions in the children's world are relatively simple. The emotions of their foreign objects are usually expressed in the state of being satisfied. Designers need to use spatial language to communicate emotionally with them and let them get in space. Satisfaction can leave memories in their growth, so build their favorite emotional memory interaction space.

3) *In line with the child's own behavioral characteristics:* From the game of peekaboo, children can see that children like to hide themselves. Most children like to drill holes, and they like to bury their body parts in white sand when playing in the sand pool. If you want to do such activities, designers need their game factors and the conditions they need to build the space. Of course, children will also have behavioral characteristics that like to run in a space that is large enough, as well as role-playing games. In the author's field survey, I

will observe that some children like to use tools that they bring from their homes or use natural branches to have similar excavation actions on regular lawn boundaries. At first they didn't know what they were going to do, but they passed them. In the chat, it is known that the soil and stones are collected, and the game of "cooking rice" is taken after picking flowers and plants. Children who are slightly older will want to collect the soil and go back to plant the plants. For children who love nature, are curious about things, and the behavior of picking flowers and grasses that make the roadside regular, the designer should consider how to guide correctly when designing space.

4) *Adapting to the characteristics of children's thinking development:* The main feature of children's thinking development is that children's understanding, judgment and generalization are slow to develop. Under such circumstances, it is necessary to use figurative foreign objects to help them remember. Such memory is divided into emotional memory and rational memory, especially rational memory. When children learn science knowledge points in school, if they can experience a variety of geometric figures in the outdoor activity space or feel the contact with different things through the senses, then they can help them smoothly. Accept more knowledge and lay the foundation for the development of their imagination.

5) *Objective condition factors:* There are also some necessary objective factors in the outdoor activity space of children in the residential area. These factors will also have certain influence on the placement of game equipment in the space, so special attention is required, such as sewers, drainage holes, lamp posts, obstacles, things and so on.

6) *Climate impact:* Climate and weather conditions will also have a certain impact on the way and time of use of children's outdoor activities in residential areas. For example, when it is raining, the outdoor exposed water is wet by the rain, the ground is slippery, there is a safety hazard, the children can't carry out the activities; the absence of sunlight in the summer will make the ground paving and facilities overheat, which will cause the children who are active on the field to feel uncomfortable; It is also difficult to make people outdoors when it is snow or ice. Therefore, in the design of children's outdoor activity space, attention should be paid to constructing the covering of the space or using plants to balance the heat of the site, or setting the water source for cooling. Designers also need to fully consider the impact of microclimates and try to improve them to maximize the frequency of use of the site in different weather conditions.

B. Children's Outdoor Activities Space Planning and Design Principles

1) *Principle of accessibility:* From the perspective of macro-level planning, the planning structure and environment of urban residential areas should correspond to children's outdoor activity space, and try to achieve even distribution. From the perspective of micro-design, urban

residential areas should first reserve space for children's outdoor activities. Different levels of residential areas should have different planned areas. The spatial structure function of residential areas requires children who can perform outdoor activities in space. The body and mind are satisfied. Only by comprehensive consideration from different levels, the planning and construction of children's outdoor activity space in residential areas can have good participation and accessibility.

2) *Interesting principles:* How to make the design of the space more interesting and attract children of different ages to participate in the activity is difficult for children and designers themselves to find common ground. It depends on how to grasp the children's psychology. But the first priority is to follow the "child-oriented" principle. Children are the main active people in the space. The quality of the activity space determines whether the children's needs and psychological needs in the process of growing up are met. Outdoor games are an indispensable part of children's growth. Children's outdoor activities should be the space that children are yearning for. Space should not be designed to make children feel bored, so design needs enough fun to attract them in space. Medium activities are necessary.

3) *Targeted principles:* Children who have analyzed different ages have different psychological and behavioral differences, so designers must take into account the needs of children of different ages, which helps to maximize the utilization of space, planning and designing Space for children of different ages. Of course, this does not mean that the physical activity space for children is divided according to age, which reflects a dialectical design process of comprehensive utilization of space.

In the residential area, children's activity space needs to be reserved for children to play, so the children's outdoor activity space and the environment in which they are located need to be in a harmonious state, because it will affect the landscape effect of the entire residential area. In order to meet the psychological characteristics of children, designers need to create a unique and innovative style from the spatial composition, vertical design, texture, material, color, etc., to promote children's communication with outdoor space, exercise their body and mind.

4) *Principle of blending:* Although the main body of the children's outdoor activity space is undoubted, the author believes that other general populations in the residential area also need to be considered. Adults account for the majority of the residential area as a whole, and the number of children and all other aspects are at a disadvantage. From this point of view, today's children's outdoor activity space has not received enough attention. In addition to the low utilization rate of children's outdoor activity space, it is necessary to fully consider how to comprehensively utilize the resources in the residential area in terms of its spatial composition. In addition, there should be a residential environment in which children's activities and adults interact with each other.

Considering that children's outdoor activities are time-based and seasonal, designers can consider providing a space for adults to communicate with each other while meeting the needs of the service subject, thereby increasing the space utilization rate of children's outdoor activities in residential areas.

5) *Comprehensive principles*: The outdoor activity space for children in residential areas is not only a place for children's sports games, but a comprehensive space to be considered in terms of structure and function. As found in the survey, most people only think that the outdoor activity space for children in the residential area is not only the growth space for children's game communication, but it is also part of the residential area landscape. And few people think that it can create a diversity of natural habitats, home to animals and plants. From a macro perspective, the planning of children's outdoor activity space in urban residential areas is a subsystem in the planning of the entire residential area. While ensuring that children's activities are not interfered and safely interfered with each other, they should be related to the components of the community. Roads, greening, and the environment are considered together.

6) *Accessibility and safety principles*: The principle of accessibility refers to the design of children of different ages. The height of the line of sight and the proportion of the device should be determined according to the characteristics of the child. In addition, it should be considered that if adults want to participate in the game subjectively, the scale of interactive space and gaming facilities should not be an objective factor limiting their activities. At the same time, it should also be considered for children with disabilities. They also have the right to play in the venue. Therefore, it is necessary to give them the respect and care they deserve in designing every space that they can access and reach as much as possible.

The principle of safety is a problem that should be paid attention to from beginning to end. Considering safety and liberating the child's nature, it is necessary to design a space for children's outdoor activities that is both safe and challenging. But before that, you need to distinguish the essential differences between danger and risk or challenge. As was reported, the safety-conscious Japanese spent 500 million yen to build a most "dangerous" kindergarten. This is a ring-shaped building that is described as "no terminal", no walls, no isolation, children can run freely on the outdoor roof and open flat playground and indoor classrooms, there is no place to reach. Although it is a building, it has certain reference significance for the creation of landscapes in children's outdoor activities. Because of this free and open atmosphere, it is conducive to cultivating the curiosity and hobbies of children of different ages, and it can also stimulate their subjective initiative. All the designs that seem to cause harm or hidden dangers to children are considered by designers, but there is no absoluteness in everything, and all safety considerations are relative. When children are exercising, there may be cases of falls and skins, but these are not problems, but they are just part of the necessary risks

for children to grow and develop. Back to the designer's point of view, if the child is injured because of the design space or facilities, the designer should also bear the corresponding responsibility. Regardless of the circumstances, the safety of children should be the primary concern. Here, the safety of the outdoor activity space for children in residential areas is designed. The author believes that it is generally reflected in the following aspects.

a) *Vertical design security*: While seeking the innovative changes in the terrain to enhance the challenge of the space, the height difference should be considered by the parents. When the parents sit in the rest area and let the children exercise alone, they can easily capture their children's presence on the line of sight. This will make them more free to let them do free activities. At the same time, the child's sight can also easily capture the parents, so that it is more able to exercise dependent children to leave the parents to play. The designer should pay attention to the highest drop point of the space, beyond a certain height, and even the paving material with the cushioning effect on the ground will lose its protection.

b) *Safety of ground materials*: Under all gaming equipment, a cushioned impact face stock must be placed. In addition to the protective pavement, children need to feel different hard materials with touch, such as in the game to understand the shape of the material and the smooth and rough texture, thick and thin, hard and soft, etc. But you need to keep these materials safe.

c) *Traffic safety*: In the residential area, attention needs to be paid to the separation of people and vehicles, and the outdoor space for children needs to be established in an area separated from the roadway. Because children tend to be relatively concentrated in the game, they often don't notice what's happening around them, plus the characteristics of active, like to run around on the field. Even if they have planned a safe space for them, they will expand this range and will inevitably appear on the main roads in the community. Here, designers need to strictly and rationally plan the traffic roads in the residential areas, reduce or even avoid mutual interference, and try to ensure the safety of children's activities.

d) *Safety of public facilities and gaming equipment*: Public facilities refer to seats, lamp posts, manhole covers, etc. placed in the site. If it is a seat made of stone, etc., it needs to be rounded. The height of the energized part of the lamp post needs to be at a height that is not accessible to the child. If it is a hollow manhole cover, the spacing should not be greater than the width of the child's foot. There is also a certain danger in the game facilities themselves, so in the design and selection of the equipment, it is necessary to pay attention to reduce the risk of being pinched. Natural materials should be used as much as possible in the design. These materials can be obtained not only from recycling, but also cost-saving, environmentally friendly and renewable. It is also relatively safe, and in addition these natural materials give children a chance to get in touch with nature.

III. CHILDREN'S OUTDOOR ACTIVITY SPACE PLANNING AND DESIGN METHOD

A. Site Design

1) *Functional partitioning of the site:* The design first needs to locate the spatial location of activities of different ages in the residential area. The planning needs to consider different spatial changes and the setting requirements of the combination of activities and rest. After that, the specific consideration needs to be based on the needs of different groups of people for its targeted space design.

2) *Site size and area:* At present, the national standard stipulates that the greening quota of residential areas is not less than 1.5m²/resident, and the children's play field can be calculated by 0.5-1.0m²/resident. According to the planning of the residential area, the green space index in the new code is designed, and according to the average of 0.3 children per household, the per capita calculation can be concluded.

3) *Site selection requirements:* The location requirements are also mentioned in the previous article. There is no area with less traffic flow. Try to avoid traffic islands and intersections, because even if the venue is in a closed state, parents will worry about the location where children can use it nearby, so that they can enter and exit at any time. The site also requires areas with good illumination and relatively long light exposure, with good ventilation and proper shaded plots. If there is a change in the terrain, you can choose a lower-lying area. The height of the surrounding area is similar to that of the barrier, and the line of sight seen by adults around the interior of the site will be clearer.

4) Design elements of the venue

a) *Entrance and exit:* The design should be able to make the child notice clearly and attract them. The entrance and exit design does not need to be too complicated, simple and clear, you can use the elements that children like, such as colorful paving and cartoon sculptures and interesting water body modeling, etc., and can also use the sense of smell, hearing, etc., such as the floral fragrance of the entrance and the falling water. Sound, etc., let the child have a curious mind about space. All in all, it is to avoid the space entrance design that is too adult.

b) *Terrain:* For children aged 0-6, the terrain avoids excessive changes, the space requirements are as open and flat as possible, there is no water accumulation, and the drainage slope is 1%-5%. If the land is too flat, you can have a suitable gentle slope with a slope of 5%-15%. According to ergonomics, the "strip-shaped soil slope" with the seat back function can be stacked on the grass. According to ergonomics and actual experience, the author thinks that it is suitable at about 105 degrees. Setting the slope at the boundary of the site will also play a role in shielding. Of course, in addition to the role of natural isolation, the wind direction in the site can be adjusted. For children aged 7-12, it is necessary to look at the surrounding environment in a higher and more diverse perspective. Designers need to

design a height difference that will appeal to children and make the venue challenging and risky.

c) *Roads and partitions:* Considering that children are eager to get to the game place, the road design leading to the activity space can be as simple and clear as possible, and the road design form should be natural and smooth. The combination of curves and straight forms highlights the vivid freedom of the road, which is intended to let children experience the different feelings of straight space and curved space. The roads in the venue can be less obvious, especially in the lower ages, so that you can leave a large space for them to walk freely. It is also possible to consider an open entrance, which has the advantage of dispersing the flow of people, not focusing on the area of activity, and reflecting its freedom. On the other hand, unclear roads can also use the color of the paving line to guide children into appropriate recreational space, reflecting guiding and order. In view of the connection between different activities, the author believes that it is necessary to emphasize its naturalness. Do not rely on some structures to make a hard separation of the site with a moderate spacing. It can also be separated by means of changes in the color of the pavement, differences in materials, plant configuration, height difference, etc., so that the partitions can also be inadvertently become the highlight of the design in the field.

d) *Paving material:* The paving in the children's outdoor activity space uses colorful color blocks to attract children's attention. It is not necessary to have more complicated changes to avoid feeling dizzy for children. The need to pay attention to the choice of different materials is to avoid the choice of materials that cause dizziness in a strong urban environment.

The author advocates more soft landscapes such as lawns, but the lawn is not as high as the use of sand pools and hard materials because the maintenance costs are higher than the two. However, large lawns allow children to enjoy natural activities, such as chasing, kicking, rolling, and other dynamic activities, and allowing them to sunbathe under the leadership of adults. In addition, the lawn also has its ecological functions. I will not elaborate on it here. The last thing to note is that the children's game lawn should adopt velvet grass, sedge grass and other resistant grass species, and the slope should be greater than 5 %, because it can help drain.

e) *Natural elements:* Soil, sand and water are natural elements that designers often think of. If the site has natural conditions, you can make good use of the existing natural space and properly combine the natural elements such as soil, water, plants and terrain into the site, to make it a natural artificial construction environment and a usable and safe natural but artificially organized environment that allows children to free themselves in such a space. You can also choose some big trees with lower branching points. After making safety protection measures, let the children of the appropriate age climb to feel the power of nature. In addition to plants and animals in nature, if there is a relatively rich

and non-threatening life in the field, it will attract children to play in the space. Sand is an element that designers often use when designing children's outdoor activities, but it should be noted that there should be at least 50cm of sand in the bunker, which needs to be partially blocked to ensure the humidity in the sand pool, and should also be aware of the drainage problem. When not in use, it should be covered to prevent the animal from polluting the sand. The barbed wire frame is a simple and effective covering. The cover should be kept transparent so that the sun can disinfect the sand.

In addition to these visible natural elements, there are elements such as wind, light, floral, and mist that need to be used and created by designers. In addition to natural winds, you can use the swing to feel the wind through repetitive movements. You can also feel the charm of flowers in the sea of flowers. Use different angles, whether it is artificial light source at night or natural light during the day to create light and shadow effects, so that the whole venue has a mysterious and vibrant color. Designers can also use many physical phenomena to apply them to the venue, so that children can feel the magic of nature.

B. Greening Design

1) *Greening effect*: In any landscape construction, the design of greening occupies a very important position. In the outdoor activity space of children discussed in this paper, the greening effect has the following effects.

a) *Sensory stimulation*: Using the morphological characteristics and odor differences of different plants in different growing environments, these are applied to the design, allowing children to fully mobilize the five senses to conduct a comprehensive understanding and experience of natural things. In addition, children can use different tools such as pebbles to tap different materials to get different sound experiences;

b) *Adventures and challenges*: The use of large trees to carry out multiple challenge opportunities and multi-level skill training has also been mentioned. It is also possible to use different shapes of grass slopes to carry out different activities;

c) *Defining boundaries*: Plants can be used to make clear but transparent spatial separations. The height of the vegetation and the degree of canopy determine the degree of privacy of the sound and sight, and even the smallest plants can determine a boundary;

d) *Learning*: The name type of the tree species can be marked in different planting areas in the community so that the child can be recognized and learned anywhere in the community. Planting plants with varying colors in the four seasons can create beauty in different seasons. In fact, whether it is the lush vegetation of summer plants, the bleakness of autumn, the vitality of spring or the glory of winter, it is the most natural look of nature. Children can learn and learn about changes in color and shape from plants of different seasons;

2) *Green form*: In the form of greening, the height of the line of sight of children of different ages and the atmosphere of the space should be considered. For example, when children need to be intimately contacted and carefully observed, they should use low shrubs to observe them. And learning can also be used to separate spaces. In the vertical direction, the plant can also be configured to combine with the hard wall to present an ecologically natural effect. On the site, you can also decorate the unique ornamental trees. The tall trees are used for shading and for school-age children to climb. Finally, it is necessary to design a unique green ware to provide more interesting and interesting landscape images for the venue.

3) *Plant configuration*: All plants are a potential resource for children. But first of all, we should consider whether the plant is harmful, such as whether it is toxic, whether it is thorny, etc., because it is considered that the children will pick the plants out of curiosity, which is destructive, so it is suitable for planting in such a space. Plants that are less sensitive to damage, and delicate plants should be planted in locations that are difficult for children to touch.

When choosing a branch with a lower branch that allows the child to climb, it is necessary to consider setting a drop zone under the tree and laying a cushioning ground. The dense fishnet can be used to make a tree-like look. It is best to choose deciduous trees in the choice of tree species for two reasons. First, it can provide shade in the summer and sunlight in the winter. Second, its color change can show the change of the season.

In the plant configuration, attention should be paid to the layering caused by the growth height of different plants, so that they can better control the wind direction in the site in addition to appreciating the value in the field.

C. Game Facilities and Architectural Sketch Design

The author believes that the design of the amusement facilities is an icing on the cake for the whole space, and is not an objective criterion for determining the success of outdoor space design. But the importance is beyond reproach, so the key to the setting and selection of amusement equipment is to deal with the infinite imagination and creativity, and open the door to children's intellectual development. Children's outdoor activities in urban residential areas are different from children's parks and playgrounds. Because of the different factors such as the degree of importance, they are generally restricted by land use. No matter whether it is scale or arrangement or cost, there is no way to compare it with the former. However, in the limited outdoor space, it is still possible to design environmentally friendly and interesting devices for children to play with. The result of the integration with the overall design is that it will increase the use value of the entire activity space.

1) *Game facility design*: The versatile wall design will also be an innovation in the design of the event space. The

diversified functions of the wall can be displayed in many places, such as designing its hollow shape to create light and shadow relationship under different sunlight. The hollow position of the wall can also have the function of the seat, and its height can also be blocked. The role and the role of blocking noise, you can also design a wall suitable for children to climb. The game wall can also be made into a wall suitable for children's painting, guiding and cultivating children's artistic hobbies.

As part of the activity space, game devices often play an important role in the separation of space and the creation of miniature fun spaces. Appropriate gaming equipment should be selected according to the height and activity characteristics of children of different ages. Game equipment must meet the requirements of children's activities of different ages, and also consider safety. For example, children of other age groups should be prevented from causing damage to game equipment due to improper use, which may bring unsafe factors. Game equipment can be divided into swinging, landing, sliding, combined, climbing, hanging, and rotary according to the activity mode. Children's outdoor activity space in urban residential areas can choose different types of game equipment according to different children's activity areas.

2) Architectural sketch design

a) Building: School-age children's spaces can have more changes at the spatial level, as this can make the site more risky and challenging. Designers can consider designing a two-story building with a small amount of space. The first floor can be used as a semi-open event space for children to provide space for activities in bad weather. The second layer has the advantage of being able to look down the entire site from a higher perspective, allowing the child to experience different scales.

b) Seat: The seat is the most common facility in the recreation space. The function is to provide children and parents with a space for rest, viewing and communication. It is decorative and has a rich starting point for the environment. The seats in the children's outdoor activity space should be novel and vivid in shape, more varied in function and more comfortable. The seat can be set at the boundary of the activity site, under the tree shade, pool, beside the bunker, small roadside, etc. It should be made of materials that are not afraid of sun and rain. It can be made of wood material, colorful plastic and fiberglass.

c) Ground blackboard: Children's childhood interest in scribbling painting is very strong, and can be combined with paving, wall or set up a blackboard to write alone. It is necessary to consider the height of children of different ages. For example, younger children are suitable for painting on the ground, while children above school age are suitable for standing in a standing position. In any case, setting such a structure will definitely provide children with more possibility of more creation.

d) Trash can: In the design of the height of the waste bin, height issues should be considered. On the one hand, in

order to cultivate their environmental awareness from the early stage of their children's growth, the garbage bins are adjusted to the height corresponding to the child's height; on the other hand, the young children's hands-on ability is in the development stage, and they tend to easily reach the low level. In order to prevent children from touching unclean objects, the design height of the trash can should be in a position that is not accessible to them, so this needs to be discretionary. From the position of the garbage can, it should be placed in a space that is easy to produce garbage, such as rest space, entrance and exit. In the design of the appearance of the garbage can, it should reflect more innovation. The author believes that it is necessary to pay attention to the details of the design, because the details can enhance the fun of the space.

e) Hand basin: The sink is important for the children's outdoor activity space. If the child is dirty and wants to go home to clean up, the parents will feel very troublesome. This will shorten the time the children are outdoors, and they need water when they are playing with the sand or when watering the planting area. In short, if there is such a public facility in the venue, it will bring more convenience to different groups of people.

f) Lighting facilities: Appropriate lighting in the children's outdoor activity space can increase the children's playing time, especially on summer evenings, for children to play for a long time, while lighting can make children and parents safer in the game space. You can also design a little bit of decorative lighting to give children a mysterious and full of fantasy space.

IV. CONCLUSION

With the advancement of urban construction technology and the steady development of economy, people pay more and more attention to the quality of life. The internal landscape construction of urban residential areas has made great progress, and more and more attention is paid to children's outdoor activities in residential areas. Children are the most active group in the residential area, so designers should design a game space that will satisfy them. However, the process of really planning and designing is very complicated. This article is only a preliminary discussion on the planning and design of children's outdoor activities in residential areas, and hopes to get more attention from experts, designers and builders.

The construction of children's daily outdoor activities requires the support and recognition of all aspects of society. It is not a one-time problem, and depends on many factors, including social concepts, cultural environment, educational methods, professional theoretical research status, design institute mechanism, and implementation, strategy, etc. In view of the current development of children's outdoor activity space, further research on children's outdoor activity space can be considered from the following aspects.

A. *Learning from Foreign Countries, Learning from Each Other*

In view of the current development of children's outdoor activity space in residential areas in China, the research needs to learn from foreign excellent design, so as to propose a better and more innovative development model for the construction of children's outdoor activity space in China.

B. *Emphasizing on Nature and Good Publicity*

The reasons for the old-fashioned education system and concepts are that many children will be urged to cultivate so-called hobbies at a very young age, resulting in less time for children to get in touch with the natural world, and thus the frequency of outdoor activities in residential areas is not high. The reason is that the degree of attention paid by the community is obviously insufficient. At present, different groups of people should recognize the importance and necessity of building a good outdoor children's activity space;

C. *Integrating Resources and Cooperating*

The construction of children's outdoor activity space in residential areas is the result of a comprehensive design, which requires the joint efforts of architects, landscape architects, environmental designers, early childhood educators and other scholars of different natures;

D. *Improving Quality and Standard*

In terms of hardware regulations, China's normative content and implementation are not common. Therefore, we should conduct research from the normative content as soon as possible, learn from foreign advanced copywriting, and combine the domestic situation to formulate maturity provisions as soon as possible. Make changes and finally promote them.

The construction of children's outdoor activity space in urban residential areas is a systematic project. This paper mainly focuses on the children's outdoor space design by empathy, in addition to thinking about children in the perspective of children. Many specific issues need to be addressed to solve them. As the society continues to improve, there will be more new problems. The improvement of the theoretical system related to the design of children's outdoor activities in urban residential areas has a long way to go.

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