

Studying of Outdoor Landscape Design in Residential District Based on Children's Behavior and Needs

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Abstract—Children are main participants and experiencers of public space, but residential landscape designers usually neglect their physiological and psychological needs for outdoor environment. The paper first points out the existing problems of children's playground in residential community, and then analyzes children's behaviors and needs for outdoor environment. Based on the analysis, the paper puts forward some tentative suggestions on the approach of designing children's playground in residential community and aims to create a better living environment for children.

Keywords- Children; Residential Community; Landscape Design; Needs; Behavior

I. INTRODUCTION

In landscape design of residential community, designers often neglect the need of children. However, activity space for children in residential community can be regarded as major places, apart from kindergarten, where they can learn and grow. A study on children's behavior and needs, both psychological and physiological, is meaningful and will help to create a better outdoor environment for their mental and physical health.



Figure 1. The basketball court becomes the place where children and caregivers often stay.

II. PROBLEMS OF PLAYGROUND FOR CHILDREN IN RESIDENTIAL COMMUNITY

Generally speaking, there are several major problems of playgrounds for children in the residential communities of urban China. Firstly, these playgrounds tend to be oversimplified and the design often descends to the choice of location and recreation facilities. To make it worse, the facilities of the playgrounds are quite similar and lack originality, which is not good at stimulating curiosity from children. Secondly, the space of the playgrounds in most residential communities is not enough, which forces children to play in adults' playgrounds. In most communities, basketball court becomes a place where children and their guardians play and stay, which not only poses a threat to the safety of children but also affects adults' regular exercise (Fig. 1). Thirdly, the design of the playground is not human-oriented and designers rarely consider the need of children's guardians. In residential communities, a lot of grandparents, who take care of their grandchildren, will carry small stools with them or simply sit on the beside of flowerbed or curbstone. Guardians in China usually assemble their children in groups since they are fond of chatting with each other while watching, which, on the one hand, helps children find playmates, and on the other hand, provides an opportunity for adults to keep contact with others and exchange their mothering experiences. However, most designers ignore the need of guardians when designing the layout of landscape environment. In addition, seats for adults are far from enough and set inconveniently for the communication between guardians.

III. CHILDREN'S BEHAVIOR AND NEED FOR OUTDOOR ENVIRONMENT IN RESIDENTIAL COMMUNITY

A. Mental and Behavioral Features of Children in Different Ages

During the first three years, children gradually develop their skills of crawling, standing and walking. Two-year-old kids are usually fond of walking about as they gradually develop the skill. As they grow older, they will pick up some more complicated movements, including

running, jumping, climbing and hurdling. In the three years, children's sensory system rapidly develops and they start to perceive and understand the outside world. Thus they love listening to, watching and touching physical objects and pay special attention to those with bright colors or interesting sounds, and they also start to try playing simple games. However, children of this period are vulnerable to the change and danger of outside environment, which means that guardians should always keep an eye upon their children's behavior.

Children from 3 to 6 years start to develop their social consciousness. They usually play games in groups, which will help develop their communicative ability and construct certain interpersonal relationship. From psychological perspective, children during this period tend to copy adults' behavior to understand and adapt to society and they still cannot control their behavior consciously, so their mood is easily affected by the change of environment. Since the period from 3 to 6 is pivotal phase for the growth of children, outdoor environment in residential community can not be neglected and there should be physical environment and facilities healthy for the growth of children.

B. Children's Need for Outdoor Environment in Residential Community

Children are main participants and users of outdoor environment in residential community. Their behavior is quite different from that of adults and they, compared with adults, interact with outside environment more directly and actively.

1) Need for Communication

In communication with their playmates, children learn to cooperate and develop their social communication. However, with the fast development of urbanization and the increasing number of cars and motors, it becomes impossible for urban children to play with their playmates on a big open area far away from their homes. Firstly, there may be no such an open area; secondly, it is dangerous for children to cross the road. Some kids have no choice but to stay in their homes watching TV all day since the guardians, usually their old grand parents, do not have enough energy to do the laborious task—guarding children in a complicated environment. Therefore, it is very important to design a better outdoor environment in social community for children.

Children's social behaviors can be mainly divided into for types, including watching, participating, backing off and hiding. According to previous studies, 25% to 50% of children are watching other children's behaviors on playground. Watching is a preparation before they participate in activities and Watching itself is quite significant for children's growth. Therefore, some facilities should be set up so that kids can sit or watch. Secondly, private space containing 1 or 2 kids is an important component in outdoor environment because children sometimes need to be left alone. Private space is the interface between sports space and communication space. However, when designing hiding places, designers should take security into account. Hiding places should be

made to shut off the observation from other kids instead of that from their guardians.

2) Need for the Development of Sensory System

Children perceive the surroundings in a quite direct and sensitive way. Physical environment will pose immediate stimuli for children. The color, texture, and shape of an object or the layout of playground are enough to encourage children to interact with outside environment and thus learn a lot during the process. Therefore, designers should create an environment that can stimulate children's interest and develop their sensory system. Flexible space, different materials and colorful surfaces should be applied to attract children's attention to the surrounding environment so that children can study and explore this varied world in their unique way.

3) Need for Motor Development

Motor development is essential and closely related with Children's health. Generally speaking, Children's games conducted in residential community include running, walking and riding, etc, and each game needs appropriate physical environment. For example, compared with running and walking, riding proposes a stricter demand to the environment. Taking children's vehicles and motion feature into consideration, designers, if possible, design small dedicated lanes for children around or across the playground in residential community. On the premise of safety, the lanes should be curved and slightly rolling without quarter turn so as to inspire children's interest and curiosity. In addition, steps and ramps beside or around should be well-defined to offer the best convenience for children instead of posing an obstacle (Fig. 2).



Figure 2. Road design without consideration of baby carriages

IV. PRINCIPLES OF DESIGNING CHILDREN'S PLAYGROUND IN RESIDENTIAL COMMUNITY

A. Topographic Design

Compared with regular and level ground, irregular terrain is much more popular with children. Original terrain configuration can provide more chances to arouse the interest from children. In the design of terrain structure, designers should emphasize irregularity of terrain, including changing declivity of certain slopes and

creating some little faults, to stimulate the interest of children since they are fond of playing games like hide-and-seek on irregular terrain. If the original terrain lacks changes, designers should integrate mound, slope and ditch into the topography so that children will have a greater interest in exploring outside world, and thus develop their spatial cognition.



Figure 4. Picking fruit

B. Planting Design

Planting is an important measure adopted by landscape designers to create certain atmosphere for children's playfield. Plants can be important learning resources for children since they can sense the change of seasons through observing seasonal changes of plants. There should be some seasonal plants in residential community so that children can discern that flowers boom in spring, the crowns of trees in summer provide a big shade protecting them against hot sunshine, fruits ripen in autumn and leaves fall and trees become dormant in winter. In addition, designers should choose Ornamental flower plants, Ornamental Foliage Plants, Ornamental Fruit Plants, and plants with certain fragrance, which can accelerate the development of children's 5 cognitive facilities, including sight, hearing, taste, smell and feeling. The flowers, leaves and fruits of these plants can be children's "toys", which help children to explore the texture and smell of the plants (Fig. 3). However, in this sense, plants should be carefully chosen so as not to hurt children. Poisonous plants should definitely be excluded, and plants with thorn, mucilage, or dyeing fruits should be avoided. Currently, the plants in residential community tend to be those with high appreciation value, and designers rarely consider the danger that the plants will bring to children. For example, Nandina can be seen in many residential communities and its scarlet fruits are very attractive to children, so it is quite common to see children play the fruits with their hands and some parents will pick the fruits for their children to play with.



Figure 3. Common Nandina in residential community

However, if the scarlet fruits are eaten by children, children will develop lightheadedness, vomit or narcosis. Plant Collection Database places Nandina into Toxicity Category, and the description of Wikipedia is that "All parts of the plant are poisonous, containing compounds that decompose to produce hydrogen cyanide, and could potentially be fatal if ingested." (Fig. 4)

C. Design of water facilities

Being fond of water is the nature of human, especially for children. In residential communities, It is often seen that parents repeatedly ask their children not to tread puddles after rain, but children usually ignore it and still happily slosh around the puddles. What is more, children about 1 or 2 may play with their own urine. Therefore, some artificial water facilities should be designed to meet their need in the design of residential landscape. For the sake of safety, non-slippery material should be paved on the edge of the water facilities, and the depth of the water should not be over 35 to 40cm. At the same time, keeping water clean is necessary to make sure it will not make any harm to children. In addition, some related facilities, such as rest chair, should be placed near the water, which will provide convenience for adults to take care of their children.

V. CONCLUSIONS

The problems in the design of playground for children are mainly caused by inadequate understanding of children's behavior and needs, and at the same time, also connected with interest conflicts between developers, landscape experiencers and design companies. Therefore, in order to create a better living environment for children, joint efforts from different parties are necessary.

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