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Research on the Design of Children's Parks Based on Unstructured play Theory——Taking the design of the second phase renovation plan for Shanghai Taolin Park as an example

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Abstract:
This study focuses on the theory of Unstructured plays and explores a design strategy dominated by landscape space to address the limitations of traditional children's parks that overly rely on facility based and rule-based game modes. Taking the second phase renovation of Shanghai Taolin Park as the research carrier, the innovative narrative line of "exploration and treasure hunting" is adopted, connecting six major theme scenes of grassland, forest, swamp, hill, desert, and lake. Build an open and autonomous gaming environment through collaborative design of terrain shaping, natural element integration, and variable facilities. The design focuses on supporting children to initiate unstructured gaming behaviors, breaking through the singularity and constraints of constructive games, effectively stimulating children's creativity, collaboration, and problem-solving abilities, and promoting comprehensive physical and mental development.

Keywords:
Unstructured plays; Children's Park; Spatial narrative; Landscape Design

1 Theoretical research

1.1 Background

Play is important for children's physical and mental development. Play plays an important role in childhood, stimulating children's sense of participation and social interaction, and promoting children's learning through playful learning situations[1]. Principle 7 of the Declaration on the Rights of the Child, adopted by the United Nations General Assembly in 1959, clearly states: " The child shall have full opportunity for play and recreation, which should be directed to the same purposes as education; society and the public authorities shall endeavor to promote the enjoyment of this right. "[2]. Article 31 of the Convention on the Rights of the Child, adopted by the United Nations General Assembly in 1989, states: " States Parties recognize the right of the child to rest and leisure, to engage in play and recreational activities appropriate to the age of the child and to participate freely in cultural life and the arts. "[3]. China signed and subsequently acceded to the Convention in 1990, and children's right to play and play began to become a new research

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direction and produced a large number of related research results. Based on these studies and discussions, the State Council issued the "Several Opinions on the Current Development of Preschool Education", "Several Opinions on the Deepening Reform and Standardized Development of Preschool Education" and "Draft of the Preschool Education Law of the People's Republic of China (Draft for Comments)" in 2010, 2018 and 2020 respectively, proposing that kindergartens "adhere to games as basic activities" and emphasize the need to "adhere to games as basic activities and cherish the unique value of children's game activities"□In this regard, the academic community has begun to re-examine the basic issues such as the connotation, characteristics, value and legal protection of children's right to play[4].With the deepening of research, new ideas have been put forward, that is, children should not only have the right to play,"Through playful learning through play, children can develop key competencies and skills needed throughout their lives, such as creativity, problem-solving, resilience, collaboration and exploration"[5]. When these games take place outdoors, especially when combined with well-designed landscapes, learning can be even better. There have been a number of research examples around the world that have confirmed this effect, such as the famous Philadelphia Game Learning Landscape.

1.2 Unstructured play Theory and Significance

The outdoor landscape space we usually see often takes facilities as the main medium of children's games, and often forms game rules with relatively strict regulations, restricting the behavior in the game, reducing the fun of the game, and even improper use will bring some unsafe hidden dangers. Therefore, through the design of landscape space rather than simple play facilities, children can make full use of different spaces, spontaneously carry out and organize various games through imagination, organization and social skills, break through the conventional limitations, create different story scenarios that belong to everyone's heart, and invite other children to play in their own stories. This kind of game belongs to the theoretical category of Unstructured plays, which is the theoretical basis for the design research in this paper.

The game method with facilities as the main game medium belongs to the category of Constructive play. Constructive play can be a physical structure game for children, especially young children, using a variety of natural and artificial materials, such as building block games, building block games,Bamboo games, metal structure games, puzzle games, jigsaw puzzles, sand, water, snow and stone modeling games, etc.[6]□It can also be a game with strict rules and a fixed processand sometimes organizers who dominate games, such as sports games. Constructive play has its own pertinence and purpose, but sometimes it can lead to children's lack of internal drive, poor emotional experience, lack of cooperation, and resistance[7].

The unstructured play studied in this article is an open-ended game initiated by children themselves, led by themselves. Children in the game are often in motion. Unstructured play has some of the following characteristics[8]:

(1). Play at heights: When jumping over steps and small obstacles, the body will briefly leave the ground;

(2). Play at speed: Children will have a higher speed when they run and catch up;

(3). Play with loose parts: Play can take place in many places, including places that adults perceive as

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non-play;

(4). Rough-and-tumble play: Children can play with different people, and each chase can change direction at any time;

(5). Play where the children can "disappear" or "get lost": Kids can hide, both indoors and outdoors.

Active, unstructured play reduces sedentary behavior, helps promote physical health and improves motor skills. It promotes mental and emotional well-being in children and leads to positive self-concept and self-esteem. Help children develop social skills, including emotional intelligence, self-awareness, empathy, and the ability to communicate effectively in situations that require compromise and cooperation. Promotes cognitive skills development (attention, concentration, ability to complete tasks, and memory) and improves classroom behavioural performance. When children experience uncertainty through challenging play, they develop emotional reflexes, physical functioning, and coping skills, as well as their ability to cope with adversity. Enhance resilience and mental health to help them thrive better in adolescence and adulthood[8].

In order to create a place that can host unstructured play, the landscape space of the children's park can emphasize more on the shaping of the space itself, rather than the playful design of the full facility. This allows the child to engage in a variety of unstructured play that is spontaneously and organised.In the design, we make full use of the forms and elements in the space and landscape, and cooperate with appropriate facilities to generate various instinctive needs for children's games such as perception, game themes, imagination, and role playing. Such games promote children's imagination, organization and social skills, and also provide a suitable occasion and place for parents to participate and guide correctly[7].

2. Design case analysis

2.1 Design concept

In order to study the application of Unstructured play theory in design, the author selected the second phase of Taolin Park in Shanghai as the base for the design concept. The plot covers an area of about 2.8 hectares, with an approximately square shape and a relatively flat terrain. The design is mainly aimed at toddlers and children under 12 years old.

The design is based on an "adventure story" as the main line of space: the little protagonist decides to go to the island in the middle of the lake to find treasure, he runs through the empty grassland, through the dense forest, over the dangerous swamp, with the help of his friends over the rolling hills and arid barren desert, carefully wading through the lake, and finally reaches the island in the middle of the lake to find the treasure.

The whole site combines elements such as terrain, vegetation, and water bodies with episodic scenes to form a coherent narrative space sequence. Through spatial situations and appropriate facilities, children are guided to initiate and lead open-ended games in exploration, which becomes the basis for spatial layout conception. The scenes in the story are used to create different material spaces as an important carrier of children's games, and a variety of story versions are derived. This kind of design with "storytelling" as the spatial clue and "unstructured play" as the spatial mode stimulates children to create personalized play

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experiences through imagination and independent exploration, which plays an important role in promoting children's cognitive ability, social ability and emotional development.

2.2 Overall spatial analysis

The internal spatial layout of the park is based on the main story.Through the whole journey of the little protagonist's adventure, which is divided into six plot scenes: grassland, forest, swamp, hills, desert and lake (Figure 1). In each scene, according to the natural attributes and characteristics in fairy tales, and at the same time fully considering the characteristics of Unstructured plays, the corresponding terrain, materials, vegetation, facilities, etc. are created for children, and different forms of game space environments such as exploration, cognition, and construction are closely combined to make them carry different game behaviors, such as off-the-ground games, non-fixed place games, chasing games, climbing games, hiding games, etc.



Fig1 Master plan

The story begins at the main entrance at the southeast corner of the park, follows the park road west to the grassland area in the southwest corner of the park, then south into the forest area in the northwest corner, and then winds south through the swampy and hilly areas. Set up a sheltered space before reaching the desert area as a place for children and parents to gather and rest, and relieve fatigue during play. After passing through the desert area, you can take the triangular trail around the lake to the final destination, the island in the middle of the lake. The whole story flow line makes maximum use of the scale of the venue, and designs story scenes with high twists and turns, differences and playability, forming an immersive story experience. If you enter the park from a different secondary entrance, you can bring a sense of novelty and interest in the storyline and space.

2.3 Analysis of the main spaces

The grassland area is a long, narrow but open area, along the periphery of which there is an eco-friendly plastic green track with varying widths for children to run on long routes. The middle part is an open sunny lawn with a slightly undulating ground,There are irregularly paved grass and environmentally friendly plastic pavingwhere children can chase freely (Figure 2). Plants and changing ground paving also provide a basis for children to develop imagination in play, and improve children's imagination ability in play, organizational, executive and collaborative skills. At the same time, the open field can also be used as an ideal place for

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outdoor camping, picnics and gatherings for people of all ages.



Fig2 Aerial view and renderings of the grassland area

The forest area is slightly smaller than that of the grassland area, but the arbor planting area is the largest in all scene spaces.The boundary area of the forest area is also set up with a runway area with a large variation in widthIt is connected to the runway on the periphery of the grassland area, so that the two scene areas have a certain degree of spatial coherence. The interior space around the runway uses the slight elevation difference of the terrain and the vegetation of different sizes to create a visual labyrinth space. At the same time, combined with variable playgrounds, tree houses, climbing nets and other facilities, children can play obstacle chase and hiding games in this area, and cultivate physical coordination and innovative thinking Dimension (Figure 3).



Fig3 Aerial view and renderings of the forest area

The marshy area is on the eastern side of the forest area. The whole space runs northeast-southwest and presents a long and narrow shape. The swamp space topography has a certain undulation.There are a variety of interesting balancing devices at the undulations, simulating the passage built by the little protagonist and his friends when passing through the swamp space, so as to exercise the children's motor ability, balance and cooperation ability (Figure 4).

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Fig4 Aerial view and renderings of the swamp area

The northwest corner of the hilly area is connected to the southwest corner of the marshy area. The ground pavement fully draws on the ups and downs of the hills in nature, which is suitable for changing the spatial dimension of running and chasing in the game and providing a space suitable for hiding, creating a richer form of game space. The area is also appropriately equipped with climbing and jumping devices suitable for children of different ages, which are in harmony with the terrain to jointly improve children's athletic ability and adventurous spirit (Figure 5).



Fig5 Aerial view and renderings of the hilly area

The desert area has the shape of an equilateral triangle with rounded corners. Yellow is the main pavement color in the area, and the yellow of different brightness and purity distinguishes the environmentally friendly plastic floor, sand pit,Rest areas and other different spaces, and several spaces are interspersed and overlapped. There are different types of bunkers in the area that can be explored by children"Mayhem & Dogfight",It is also possible to play relatively mild construction games. The plastic floor and around the sand pit are seating with steps, tree ponds, and flower ponds on the border, so that parents can supervise the children playing in this space and provide a scene for parent-child activities（Figure 6）.



Fig6 Aerial view and renderings of the desert area

The lake area is the end point of the story, and has the largest area of all the scene spaces. Due to the natural

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nature of the area space cannot have complex forms and ups and downs like other scene spaces. In order to avoid the monotony of space, the lake area uses the rounded equilateral triangle commonly used in this design as the element, and forms the main spaces and paths such as the lake area, the large island in the middle of the lake, the small island in the middle of the lake, and the Tingbu on the lake surface. These elements are arranged from different angles, so that the spatial form of the whole lake area is still rich and lively (Figure 7). The lake area is in the form of a mirrored pool with a depth of 20 cm, which is suitable for children to play in the water and even engage in play activities that include chases, rolls and other behaviors in the water. LakeThe island is relatively empty, and the combination of water surface and suitable equipment can provide children with more interesting and creative play scenes, and enhance the intimacy with nature.

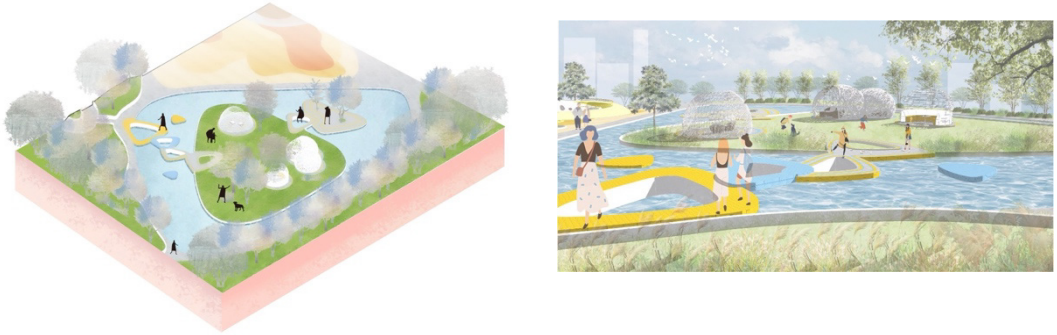


Fig7 Aerial view and renderings of the lake area

2.4 Facility design

The design takes the landscape space itself as the main carrier of children's play and provides children with a place and opportunity to carry out various Unstructured plays that can be carried out spontaneously and organized. However, with appropriate facilities, it is more conducive to enhancing children's instinctive needs for various perceptions, game themes, imagination, role-playing and other games. Therefore, some facilities are also set up in this design that can enhance the unstructured play of landscape space, and the more important ones are listed:

(1). Variable playground

The facility is modelled on a playground installation in India. The entire facility is fixed in a diagonal direction with a fixed main structure. The other parts are panels with vertical shafts that can be rotated freely. The panels are mainly in three primary colors. The panels in the central area are mainly opaque panels, with openings similar to doors and windows in the appropriate places. The panels in the edge area are mainly transparent or translucent panels (Figure 8). Children can turn the panels to create many enclosed or open spaces. The dynamic quality of the space presented by this facility will be different from time to time, and the way of spatial experience for children will be completely different, which will play an important auxiliary role in the spontaneous creation and development of children's unstructured play.

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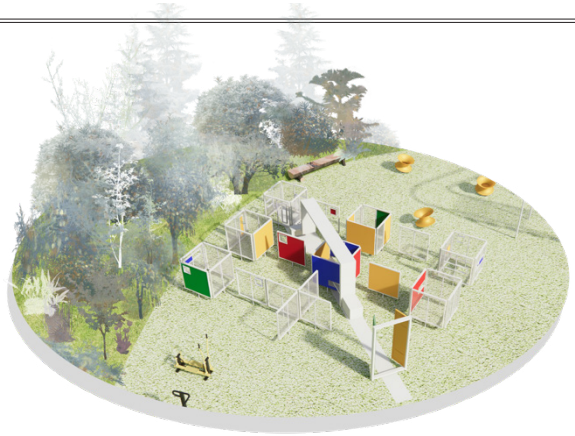


Fig8 Variable playground renderings

(2). Cabin in the woods

There are two types of facilities in this category. One is a small cabin erected at about the height of an adult's eye line, which can accommodate three to four children to hide, chat, play together and other activities, and children need to enter through ladders; The other is a log cabin erected at the eye level of children of different ages, the size is suitable for small birds to live, and the column of the supporting structure has a press switch and a QR code, which can be heard from the log cabin or mobile phone by pressing or scanning the code Bird calls (Figure 9).



Fig9 Renderings of a cabin in the woods

(3). Plant wall

These facilities use long, flat boxes made of transparent devices arranged in the shape of walls of varying heights. The branches and leaves and flowers of different types of plants are placed in the box, and a QR code is printed for mobile phone scanning, showing and explaining the names, characteristics, functions and other attributes of plants for children and parents, increasing knowledge and enhancing the interaction between children and parents. This type of plant wall is arranged in different forms in space, forming a closed, semi-enclosed enclosed space or straight line. It becomes an integral part of children's play, and is used by the child's own imagination as an obstacle in the game, a condition for completing the game, and a physical basis for initiating competition in the game (Figure 10).

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Fig10 Renderings of the plant wall

3. Summary

Based on the theory of unstructured play, this study focuses on the practical exploration of children's landscape design, aiming to create a play environment for young children that can stimulate independent creativity and promote the development of multiple abilities through the integration of spatial narrative and landscape elements. In the process of research, the core characteristics of unstructured play, namely autonomy, openness and creativity, were clarified through theoretical combing, and combined with the characteristics of children's landscape design, the design concept of "space as the carrier of play" and "story-based space connection" and "variable facility intervention" were proposed Key design strategies such as "natural element guidance". At the practical level, with the fairy tale narrative of "adventure and treasure hunting" as the main line, six theme scenes of grassland, forest, swamp, hill, desert and lake are constructed, and combined with terrain shaping, vegetation configuration, facility design and other techniques, a rich and interactive game space is formed. These spaces not only cater to the physical and psychological needs of children of different ages, but also encourage children to develop creativity, collaboration and problem-solving skills through non-fixed rules of play.

Children's landscape space is not only a physical carrier of urban space, but also a social container for children's growth. This kind of research needs to continue to explore the symbiotic relationship between space and children's development with a more open vision and more delicate insight, so that every design can become a "play poem" that nourishes children's hearts.

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