

Retraction

Retracted: Landscape Creation of Children’s Outdoor Activity Space in Urban Residential Areas Based on Child Psychology Analysis

Mobile Information Systems

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

- (1) Discrepancies in scope
- (2) Discrepancies in the description of the research reported
- (3) Discrepancies between the availability of data and the research described
- (4) Inappropriate citations
- (5) Incoherent, meaningless and/or irrelevant content included in the article
- (6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article’s content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our own Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

- [1] X. He and J. Nordin, “Landscape Creation of Children’s Outdoor Activity Space in Urban Residential Areas Based on Child Psychology Analysis,” *Mobile Information Systems*, vol. 2022, Article ID 9011311, 12 pages, 2022.

Research Article

Landscape Creation of Children's Outdoor Activity Space in Urban Residential Areas Based on Child Psychology Analysis

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The investigation of the unidentified world and the restriction field has intensified as the application concept of Artificial Intelligence (AI) continues to expand, due to which lifestyle of people and manufacturing modes have also changed dramatically. Based on these revolving trends, this work examines AI and studies children's outdoor spaces from the perspective of their behavioral psychology. Furthermore, based on the analysis of text information, this study first defines the relevant concepts, then studies the characteristics and composition of children's psychology and behavior, their habits, and activity space, respectively. In addition, this study interprets the excellent case design of children's outdoor activity space at home and abroad from the perspective of behavioral psychology to provide a theoretical basis and design a reference for the design of children's outdoor activity space. Besides, a survey of children's residential areas analyzes the current situation and problems of children's outdoor activity spaces and explores their renovation. Finally, using the author's participation in the design of children's outdoor activity spaces in residential neighborhoods as an example, it relates theory to practice. It studies and discusses the planning and design of children's outdoor activity spaces by constructing an outdoor activity space under children's behavior and psychology.

1. Introduction

Everyone has a childhood in his or her memory. We remember our childhood of chasing and playing in the country lanes, fishing and playing on the riverside, often hearing chickens and frogs, and just three or two people getting together to play with rocks and bouncing glass balls [1]. Nature provides us with such wonderful and lovely memories, which make our childhood exciting and colorful, and help us, sense the wonder and freshness of it [2]. As we grow up, there is a contradictory phenomenon around us: parents love their children and willingly provide the best conditions for their children in all aspects, but parents are blind. They think they have provided the best conditions for their children within the limits of their ability; however, it is not what they want because the children's living environment, learning environment, outdoor environment, etc. are seriously lacking, resulting in children's physical and mental development is not good [3]. As a result, there are

discrepancies in children's physical and mental development. Among these, one of the main reasons for this is that the current state of construction of outdoor spaces for children does not fully meet the wishes of children and is even designed to be contrary to children's physical and mental development [4]. More study and research on the design of children's outdoor spaces are required to meet the demands of children of all ages, which could present opportunities to perform various outdoor activities more effectively [5]. For this purpose, many techniques have been adapted but most of them failed to meet the requisite need of children of different ages. Therefore, AI is the only key technique for the landscape creation of children's outdoor activity spaces.

These days, AI is one of the most cutting-edge innovations and has a significant influence on human productivity and existence. When AI begins to interfere in the world of art, conventional art faces challenges and adjustments. Landscape creation is crucial in the creation of city beauty.

The design approach and substance of outdoor spaces have changed in the age of AI [6]. Urban landscape art holds an important position in environment art and contributes significantly to raising the level of ecological art and beautifying the surroundings. It is simpler to catch its structure and infect the viewer with its distinctive means of expression, a deep meaning, and three-dimensional area [7]. Landscape art also serves commercial, social, and regulatory purposes. It may not only represent an area's cultural features, but it can also provide the area with social and economic advantages. Modern art and landscape have been influenced by one another and experienced comparable modifications and manners of expression as a result of their shared growth. Eventually, the art of landscape, like other arts, is exhibited via the combination of design, color, resources, and other components.

Aside from the foregoing, China is the world's most populated country, with the most children [8]. According to the definition of children's age in the Convention on the Rights of the Child (0–18 years old), there are about 360 million children in China, accounting for one-sixth of the world's total number of children, of which about 150 million children live in cities [9]. In recent years, surveys have revealed an increasing number of outdoor areas developed specifically for adults in urban open spaces. However, there is still a scarcity of facilities particularly intended for children that suit the physical and psychological requirements of children of various ages [10]. Most children living in the city can only play in the shadows of high-rise buildings and around the flowing roads, and the quality of the activity environment is low and the safety of children is not guaranteed [11]. As a result, children have developed a sedentary and inactive lifestyle, which has led to a series of childhood problems: childhood obesity, adolescent anxiety, lack of child needs in transportation, and a variety of child abuse and injury problems [12]. These problems are mainly attributed to the rapid development of cities, and there is a growing awareness that children's health and well-being are inevitably linked to them [13].

Although research on play space and children's development in China is still in its early stages, some advances have been achieved in related ideas. According to the work of [14] Children's Play Facilities, a relatively comprehensive collection of some successful cases of children's playground design in China emphasizes the key points of design and children's psychological characteristics and provides a theoretical basis for the design of play spaces that promote children's mental development. Similarly, the study of [15] mentions that children's play is an important part of residential areas; therefore, they believe that the different age aggregation, time, seasonality, and self-centeredness of children's play activities are the basis for the design layout. While in [16], corresponding design principles are proposed according to the needs of children of different ages. According to [17], the fast expansion of cities tends to result in a loss of playgrounds. As a result, children spend the majority of their time in school for instruction and no time for play, thus it is critical to protect and promote play places for children's future development. Children, as the lower

stratum of many vulnerable groups, have unparalleled moral and theoretical advantages. As the most complicated of popular interests, the city is split and unavoidably managed to encompass the broad interests of children's groups [18]. As a result, the city should be designed first and foremost for children, creating a safe and comfortable atmosphere in which they may thrive and grow up healthy and happy. Because of the aforementioned problems, AI is replacing old various functions previously performed manually by humans. Yet, as technology progresses, each technical shift is always followed by the demise of existing technologies [19]. The same would be valid for creative creativity, but to advance artistically, we should actively pleasant change. As a result, it is essential to thoroughly understand the concept of children's outdoor activity space creation to expose the existing condition of up-to-date landscape creation of children's outdoor action space in urban residential areas in China based on child psychology analysis and to attempt to clarify the growth of modern landscape creation in China under the collaboration of recent multi-culture.

The key innovations of this work are listed below:

- (1) For the first time, this study uses AI for the landscape creation of children's outdoor activity spaces in urban residential areas based on child psychology analysis.
- (2) It analyses and compares several indoor and outdoor activities in terms of location, time, content, and playmate for school-aged children and preschool.
- (3) Finally, it creates the Children's space landscape using the AI technique by discussing site selection conditions, functional zoning, scale requirements, color management, and site components.

1.1. The Structure of Other Section Is Under. Section 2 discusses the related work of national and international scholars. Section 3 is based on artificial intelligence and landscape design for outdoor exercise places for children in urban residential neighborhoods. Section 4 of the article describes the suggested design of a Children's space landscape based on AI, and Section 5 concludes the study.

2. Related Work

Children's outdoor space research began quite early in Japan, as well as in various European and American countries. The Recreation Grounds Act, established in England in 1859, was the first legislation about children and play, recommending that places in town be set aside for children's play. The Athens Charter of 1933 stipulated that "in newly constructed residential districts, open spaces shall be set aside in advance for public use". "In freshly developed residential districts, space shall be left out for the creation of parks, sports, and playgrounds for children", said the Athens Charter in 1933. Article 7 of the Declaration of the Rights of the Child was adopted by the United Nations General Assembly in 1959, and it states that "children should have full opportunities for play and recreation, that play and

recreation should serve the same purposes like education, and that society and public services should make every effort to enable children to enjoy such rights". In 1961, the International Play Association was established in Denmark to discuss the development of playgrounds, and in 2004, the government of London, England, held a conference on children's environment and formulated a policy to build a city where children come first. The importance of children's playgrounds abroad is evident, and much more attention is paid to them than in China [20, 21].

Foreign researchers believe that the construction of children's playgrounds should be closely related to children's education, psychology, behavior, thinking, and cognition [22]. The U.S. "Children's Play and Play Environment" discusses the importance of children's activities and their significance to children's physical, mental, and language development in various aspects; "Humane Places: Guidelines for the Design of Urban Open Spaces" discusses the issue of children's interaction and proposes the need to design children's interaction spaces in environmental design; "Play and Early Childhood Development" emphasizes the characteristics of outdoor playground design, clarifies that a good play environment can promote children's healthy physical and mental development, and proposes that if individual play facilities are connected, many new ways of playing can be obtained, which can improve children's social interaction ability. In "Recommendations for Children's Activity Areas," the planning and design forms of children's play spaces are summarized in order to design play spaces that are conducive to children's developmental needs; there are also the American Academy of Pediatrics, "The Importance of Play in Promoting Healthy Child Development," Rhonda Clermont and Lille Florentino, "Children's Right to Play The Right to Play," Marjatta Kaliara, "Play Culture in a Changing World," Susan Solomon, "American Playgrounds: Reviving Community Spaces," and Helen Tovey, "Outdoor Play," are all important theoretical research documents on children's activity spaces [23].

3. Artificial Intelligence and Landscape Creation of Children's Outdoor Activity Space in Urban Residential Areas

3.1. AI and Landscape Creation. These days, Artificial intelligence (AI) has been used in a variety of domains of life as technology has advanced. In practical applications, AI has a high applicability value. Simultaneously, it employs cutting-edge science and technology to eliminate artificial limits and increase the correctness of AI decision-making and technical creativity. The artist is the fundamental body of creative production, and the consolidation of life, conceptual inclination, character, and personality, artistic achievement of artists serves as the foundation of artistic formation [24]. The cultural identity of an artist has always been regarded as highly crucial for their production. The quantity of information that humans can grasp nowadays is significantly less than a fraction of that of a machine. The expert scheme is mostly employed in decision-making. The method surmises

the issues to be handled by emulating specialist thought modes and eventually obtaining the relevant decision. In the real application procedure, technology may handle more complicated problems and increase the quality of the resulting judgment [25]. Mastering a variety of professional abilities necessitates a certain amount of life experience, as well as the ability to produce ideas on the spur of the moment. Machines can have human feelings and the pleasures and sorrows of regular people because the algorithm can imitate them using gene technology. In the current AI age, some AI technology is introduced to landscape scheme, which boosts landscape design intelligence while also integrating landscape architecture intelligence and creativity to establish a new landscape architecture mode.

The effectiveness of landscape design is greatly influenced by structure. Innovation is used in the design process, which may significantly increase the design and quality of landscape design. Different symbols and colors are mixed to attain the goal of enhancing landscape design excellence. The major body of artistic creativity in this work is AI and scientists. The use of science and technology will make creative creativity simple. The two life forms, as well as their respective arts, will exist for a long period. Therefore, they display more diverse landscape architecture [25].

3.2. The Inspiration of AI on Landscape Child Psychology Creation. The growth of child psychology is one of the most important components of landscape design. The construction of child psychology may not only add to the variety of overall landscape design, but it may also help to preserve the general natural equilibrium. This demonstrates the significance of child psychology creation in landscape architecture. With the advancement of science and technology, it is expected that the cost of these machines will continue to fall in the future, while production and output excellence will improve. It will be surpassed by AI in the future because robots can better meet client desires than people. AI will be more efficient and less expensive in imparting ideas to the state. People may expand the diversity and depth of Child psychology production in the AI era by developing fountains [26]. Furthermore, the integration of fountain variations and music rhythm can improve understanding of Child psychology formation and the changing nature of waterscape architecture. As a result, sculpting is more than just a design phenomenon; it is also a social force, a business phenomenon, and a political incidence. It also represents people's spiritual demands, as well as fashion, literature, and passionate humanitarian impulses. The increase in the excellence of the works will also raise the creative level of the appreciators, and the production of the workings will lead to advanced levels underneath the high expectations of the appreciators.

At the start of the landscape statue design phase, city policymakers and artists should investigate the city's particular cultural history and regional humanitarian attitude. The harmonious and self-sufficient eco-environment with

regional traits, which would be based on long-term constancy, defines the complete ecology and social basis of a region's constant rotation. The social sector has steadily resulted in a new main driver for China's economic growth. The growth and prosperity of the cultural sector not only foster the fast change in China's economic growth model but also more enhance China's industrial architecture while serving people's expanding cultural requirements. Environmental considerations, market circumstances, production characteristics, and related industries all work together to form industrial clusters. Building industrial zones and high-tech zones not only increases production per unit area but also supports the harmonious growth of local identity. Figure 1 depicts the urban collection growth paradigm.

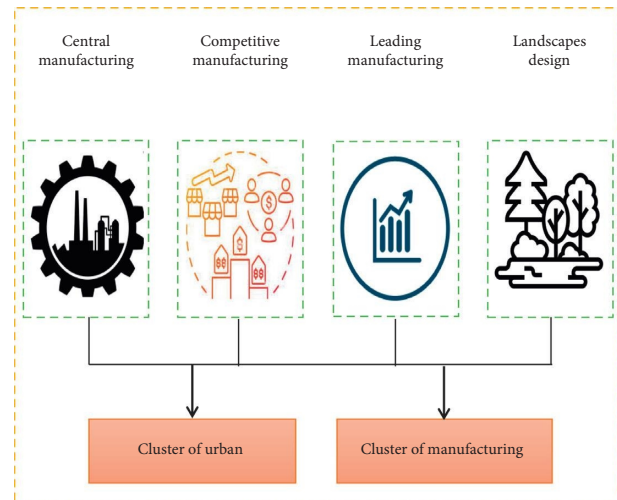


FIGURE 1: Urban collection growth paradigm.

3.3. Results of the Survey Respondents. The target population of the questionnaire survey was selected from children aged 3–12 years old, which refers to preschool-age children (3–6 years old) and school-age children (7–12 years old). Children in these two age groups differ in their interests, physical development, mental activities, and academic stress, so the questionnaire was developed in both parent and child versions to make the survey data more comprehensive. The younger children have not yet reached a certain standard in all aspects of their abilities and need to be written by their parents on their behalf. On the one hand, parents know more about their children's habits and hobbies, and on the other hand, the improvement of children's outdoor space needs some ideas and suggestions from parents.

A total of 201 questionnaires were distributed in this research project, with 184 valid surveys returned. Among them, there were 98 preschool-age children and parents, 48% of the total number of boys and 52% of the total number of girls, and 86 school-age children and parents, 49% of the total number of boys and 51% of the total number of girls, as shown in Figure 2.

3.4. Analysis of Children's Outdoor Activity Characteristics. The features of children's outdoor activity are under:

- (i) Time, place, and frequency of children's outdoor activities;
- (ii) Children's activities after school;
- (iii) Question: What do you (your child) usually do after school?

Figure 3 explains the activities of children after-school. Analysis of this Figure 3 shows that a higher percentage of preschool-age children choose to play outdoors when they return home from kindergarten, and 37% usually choose to watch TV at home. Since preschool-age children have a relatively easy learning task, the percentage of children who attend extracurricular tutoring and return home to do homework is low, accounting for 16% and 11%, respectively. Because of the increased academic demands of elementary school, the proportion of school-age children who complete homework after school is greater (61%).

In addition to homework, as shown in Figure 4 that 23% of school-age children participate in extracurricular tutoring. 28% of children choose to watch cartoons or play on the computer at home. Only 14% of children do activities outdoors:

- (i) Frequency of children's outdoor activities;
- (ii) Question: How often do you (your child) play outdoors?

Figure 5 shows the comparison of children's outdoor activities places. Figure 5 clearly shows that preschool-age children are more frequently outdoors, with 35% of children being outdoors every day, 52% being outdoors occasionally, and 13% being barely outdoors. The frequency of outdoor activity for school-age children was the opposite of that for preschoolers, with only 8% of school-age children spending less time outdoors every day. The proportion of children who were occasionally active outdoors was 61%, and the proportion of children who were barely active outdoors was 41%:

- (i) Children's outdoor activity places;
- (ii) Question: Where do you (your child) usually go to play?

Figure 5 highlights the comparison of children's outdoor activities places during school age and preschool. From the analysis of the data in this figure, it is clear that the main places where preschool children spend their time outdoors are residential areas, parks, and squares, with the proportions of 52%, 36%, and 34%, respectively. The residential area has the highest proportion, mainly because the activity space in the residential area is more suitable for parents in terms of time and distance. On weekends and holidays, parents choose to take their children to plazas and parks for activities and play. The proportion of children who are active in the streets and other places is lower, at 4% and 13%, respectively. The reason is that streets or other places are more complicated in terms of traffic and environment, and there are certain safety hazards for preschool children.

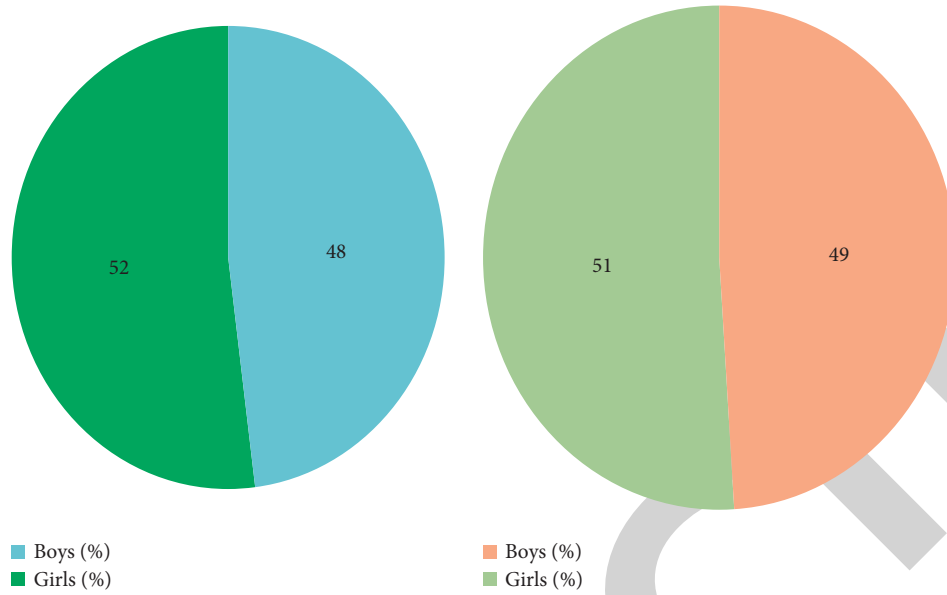


FIGURE 2: The proportion of boys and girls.

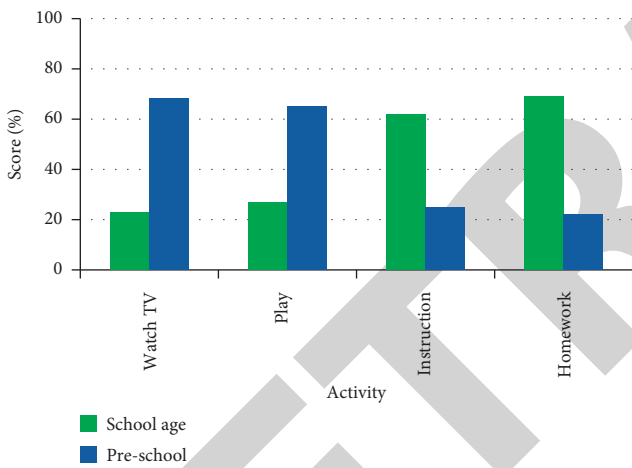


FIGURE 3: Children's after-school activities.

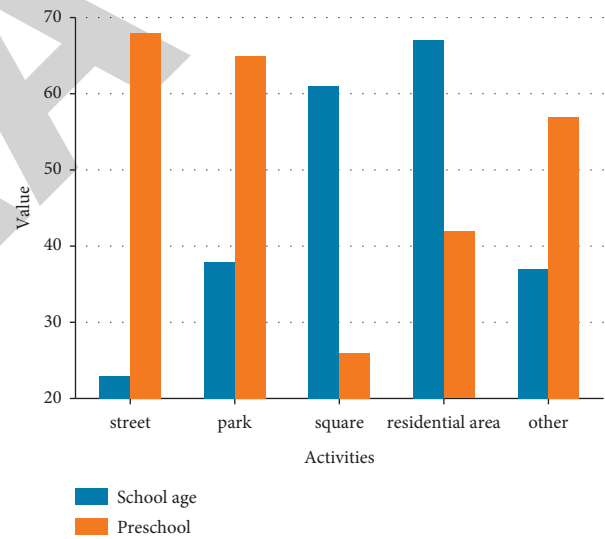


FIGURE 5: Children's outdoor activities places.

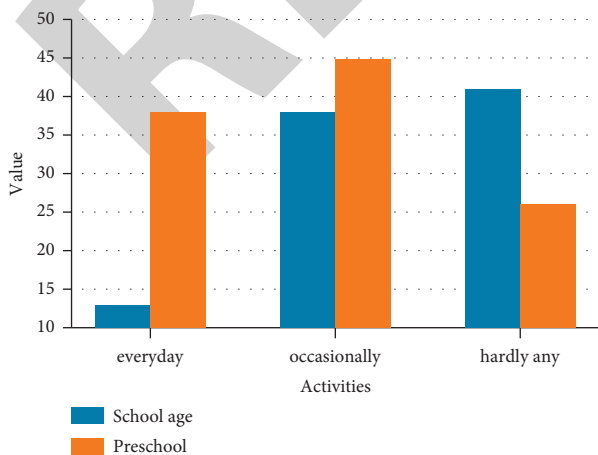


FIGURE 4: The frequency of children's outdoor activities.

Children are unable to engage in outdoor activities due to the small area and play facilities on both sides of the street. With a score of 47%, the park is where the majority of school-age children like to spend their time outside. School-age children have more space in the park and can participate in several activities. The time for activities in parks is usually on weekends or holidays. The next most popular choice for children is to spend time in residential areas, with a value of 23%. Due to homework and time limits, students can only pick the residential neighborhood for after-school outdoor activities. Streets, squares, and other activity places are less numerous, accounting for 19%, 15%, and 12%, respectively. Children may opt to stay in these locations on their way home from school or to observe what is going on in these locations, among other things:

- (i) Children spend time outdoors;
- (ii) Question: When do you (your child) usually spend more time playing outdoors?
- (iii) How long do you (your child) usually spend playing outdoors?

Figure 6 shows the comparison of children's outdoor activities of time during school age and preschool. By analyzing the data of this figure, it is clear that 62% of preschool children spent more time outdoors after school and a lower percentage spent less time outdoors in all other time periods. The majority of children in this age group spent less than 1 hour outdoors, with 43% of them spending more time outdoors. 32% of children spent 1-2 hours outdoors. The percentage of children who spent more than 2 hours playing was 25%. The proportion of school-age children who spent more time outdoors in the evening was 61%. The proportion was lower in other time periods.

Similarly, the number of school-age children who spent less than one hour outside was greater, although the proportion of children who spent 1-2 hours and more than 2 hours outdoors was relatively low. The major reasons are that as children become older, their school burden grows significantly and leaving them with less time for outside activities. In addition, children spend more time indoors because of the wide variety of electronic products in their daily lives.

3.5. Children's Outdoor Activities, Playmates, and Problems

- (i) Contents of children's outdoor activities;
- (ii) Question: What activities do you (your child) usually do outdoors?

Figure 7 explains the comparison of children's outdoor activities content during school age and preschool. Analyzing the data in this figure reveals that a large majority of preschool children, exceeding 64 percent, were free to walk around during outside activities. Water play was chosen by 38% of the youngsters, while ball games were chosen by 23%. These activities are suitable for preschoolers. Due to their early age, immature balance and coordination, and the presence of certain risky elements when conducting other activities, the proportion of children utilizing roller skating and exercise equipment is rather low, which is 12% and 14%, respectively.

School-age children mainly use ball games and free activities outdoors, followed by roller skating. During this period, children's mental development gradually becomes mature, have certain thinking abilities, like sports, running class "dynamic" activities, not particularly interested in playing with water, fitness equipment, and other static activities. Therefore, the proportion of these activities is relatively low.

- (i) Playmates for children's outdoor activities;
- (ii) Question: Who do you (your child) usually play with outdoors?

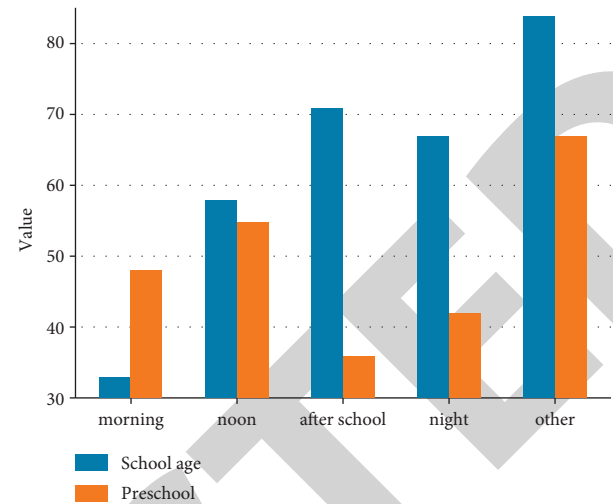


FIGURE 6: Children's outdoor activities of time.

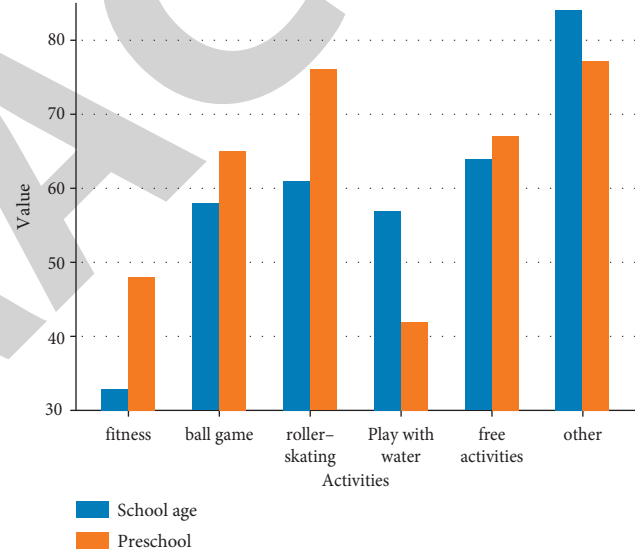


FIGURE 7: Children's outdoor activities content.

Figure 8 shows the comparison of children's outdoor activities with playmates during school age and preschool. From the data shown in this figure, it is clear that a high percentage of preschoolers, 79%, were accompanied by their parents when playing outdoors. The proportion of children who chose to play with their peers was 36%, while only 2% played alone outdoors. The high percentage of children accompanied by their parents playing outdoors is mainly because children are too young and weak in all areas. As children grow up, their social skills gradually improve and they prefer to play with their peers, while fewer children are accompanied by their parents. Therefore, the proportion of school-age children playing with peers is higher and the proportion of children playing with parents becomes lower, 57% and 37%, respectively. The percentage of children playing alone is 12%. Because most children are now more aware of safety, there are no cases of children playing with strangers in both stages.

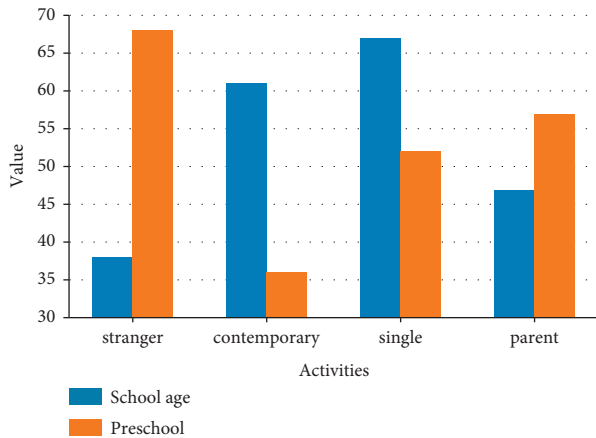


FIGURE 8: Children’s outdoor activities playmate.

4. Children’s Space Landscape Design Based on AI

4.1. Site Selection Conditions. The basis of children’s outdoor space landscape development is excellence, and location should focus on two key points: firstly, meeting the demands of ranging from children, and second, maintaining a decent micro-environment with comfort and safety. The second is to avoid interference with the lives of other residents, such as noise interference and interference with movement routes shown in Figure 9. This requires a certain degree of independence for children’s outdoor activity areas and a reduction in the intersection of other pedestrian paths. For example, if the children’s activity area is in a straight line connecting a residential building and a resident clubhouse. If there is a sidewalk outside, people will still tend to walk inside the activity area, just like the sidewalks on the lawn, and the shortest distance is what most people always prefer.

The topography area should not be too flat, which should be addressed from the start of the design, utilizing the original terrain to increase the natural advantages and boost the pleasure of the area. Figure 10 highlights creating interesting activity spaces using topography. The change of topography can not only form natural activity zones but also allow children to observe activities from different perspectives. Slides made from sloping ground are far more interesting than cold equipment, and transforming low-lying areas into ponds or filling them with fine sand for children to play adds some wildness and improves safety to some extent. In addition to placing the game equipment site, sports venues should pay attention to the flat, not water, but also should be reserved for children to play on skateboards, bicycles, and the road surface of the regular trend of change in the site [27, 28].

The size of the children’s play space must not be too large, because this would negatively impact not only the children’s feeling of security but also the standard of living of other inhabitants. In addition, the scale of the room should not be too tiny, as this would conflict with various ranging from children and lead to aggressive behavior. At the same time, consideration should be given to the accessibility of the

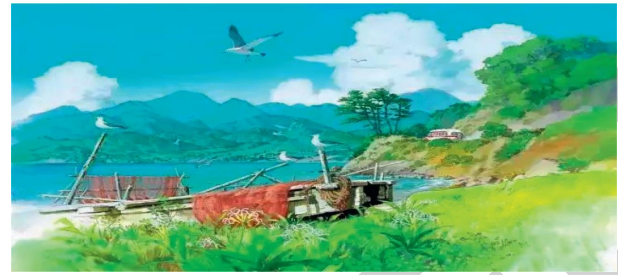


FIGURE 9: Schematic diagram of a comfortable and safe activity space.

primary users such as children and the elderly, and walking time should be kept to no more than three minutes. Therefore, according to the existing standards of residential areas in China the children’s activity sites can be calculated as 0.5–1.0 m² per capita. The scale of activity sites below the residential group level is generally 150–450 m², and the minimum area of each child is about 3.2 m². The site is preferable in the green area between houses, the service radius is not greater than 50 meters, and the amount of children is controlled at 20–30 people. The scale of activity sites at the residential group level is generally 500–1000 m², and the minimum area of each child is about 3.2 m². The minimum area of each child is approximately 8.1 m², and the site is typically placed in the group’s green area, with a service radius of no more than 150 meters and a regulated population of 20–100 children [29, 30].

4.2. Functional Zoning. Functional zoning is a common term in planning and design, but in actual life, it cannot be distinguished by the naked eye. It is usually separated by boundaries, ground coverings, or usage contents so that people can follow the “zoning” function to carry out activities in a subtle way. Among them, the most obvious zoning feature of the landscape elements is the ground pavement, and the choice of its material directly affects the content and quality of children’s activities. Pavement materials, in general, should follow the principles of safety, comfort, relevance, and aesthetics, generally divided into hard pavement, artificial elastic material pavement, loose-fill material pavement, and artificial turf pavement shown in Figure 11.

Hard pavement includes concrete, tar, masonry, etc. It is hard, easy to clean, and suitable for ball and car sports. Because of its elasticity, high slip resistance, and powerful buffering effect, artificial elastic material pavement is now the most extensively utilized in residential areas and may be considered the iconic paving, including rubber mats, rubber tiles, artificial grass, and so on. Therefore, it is more suitable to do under the game equipment paving. However, it is not easy to clean due to its poor abrasion resistance and is easy to cause skin abrasions; artificial turf is a flammable material. As a result, the application of the time, particularly the artificial turf that is a flammable substance, should be used with caution. Loose-fill material pavement is classified as organic or inorganic, with organic referring to bark, leaves,



FIGURE 10: Creating interesting activity spaces using topography.



FIGURE 11: Hard pavement, artificial elastic material pavement, and loose fill material pavement.

wood chips, and so on, and inorganic referring to fine sand, small stones, and so on. Most of these materials are practical, connected to nature, attractive, and easy to use to create a lovely ambiance. This pavement is one of the children's favorite "toys," but its after-care project is far larger, and germs thrive on it. However, its post-maintenance work is more extensive, and germs, dust, and other contaminants are considerably more prevalent than in conventional pavement, necessitating parental supervision or safety instruction. Artificial turf is the artificial planting of some trampling-resistant grass species, with small dust, soft texture, vivid colors, proximity to nature, safety, comfort, and so on. However, its maintenance costs are higher, and it is frequently changed, in northern cities, although this also takes into account the fall and winter season changes. An activity site would often blend a range of pavement materials to fulfill the various demands of different individuals employing diverse applications.

4.3. Scale Requirements. Figure 12 shows the comparison of the change in height of children of different ages. According to this figure, scale design covers not only the scale of physical exercise, but also the size of the interplay of numerous sensory experiences like sight, taste, sound, smell, and so on. The use of proper scale design in children's activities settings may assist children not only experience and grasping their environment, but also foster their motivation in learning and self-confidence. In addition, from the perspective of the overall environment, environmental facilities that conform to the scale of children can highlight

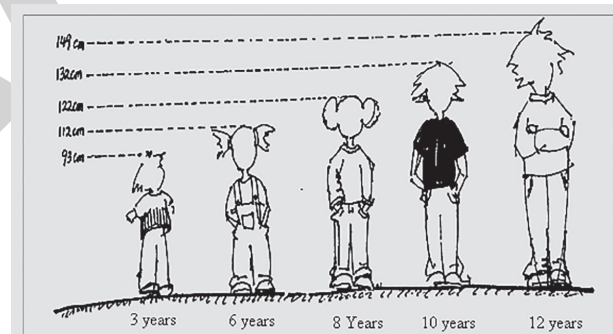


FIGURE 12: Change in height of children of different ages.

the spirit of the place and distinctive image of the activity space.

The factors in scale design consist of the scale of the area, the height of the fence, the size of the pavement, the volume of toys, and so on. These facilities should not only be convenient for children to use, but also to look at and listen to, for children to have control, minimize feelings of anxiety and frustration, and improve safety such that children may enjoy the enjoyment of playing.

4.4. Color Control. Color design is an essential component of site design, and includes plant color, pavement color, building color, structure color, lighting color, and so on. As a result, colors in various shapes and with distinguishing characteristics play an especially essential role in strengthening their memory, imagination, and creativity, all of which

are implicitly carried out in the formation of the landscape. Figure 13 shows children's activity site full of color.

4.4.1. Create the Atmosphere. For the creation of the atmosphere, first of all, we must balance the internal color based on coordination with the surrounding environment, seek unity in the change, and master the key colors, the main and secondary, contrast and harmony. Second, we must design with the theme of the place, flexible use of color symbolism, and warm and cold tones to set the atmosphere, to strengthen the functional differences of different spaces. Again is the use of artistic techniques, similar colors to highlight the soft atmosphere, to contrast color to create visual impact.

4.4.2. Decorative Beautification. A large area of cluttered colors will cause psychological pressure to produce a sense of boredom, so in the landscape design is appropriate to use elegant light colors or close to the natural color for the background color. A significant facility or entry borders, such as the use of bold and brilliant colors for adornment and decoration, make the entire place dynamic and engaging.

4.4.3. Identification and Emphasis. The most apparent suggestion is color. Using color to differentiate regions and pieces can help toddlers quickly generate spatial intention and be actively involved in activities. For example, linear color on the ground can reinforce directionality and serve as a guide for children's travel patterns, and sculptures or tiny things with vivid colors can readily become the center of attention and become a signifier.

4.4.4. Convey Emotions. Color not only has its personality but also through the sense of cold and warm, near and far, light and heavy sense to convey a different emotional experience. Generally speaking, red and yellow give people a warm feeling, while having a sense of proximity will make children in a more excited state, conducive to play. While violet, blue and green give people a cold feeling, although the sense of distance, but will make children calm, soothing, and conducive to learning and thinking. White, light blue, light yellow and other light colors help people feel relaxed, whereas black, red, ripe brown and other dark hues make people feel heavy. At the same time, children of various ages have distinct color preferences. According to one study, children aged 3 to 8 preferred, whereas children beyond 8 choose green. As a result, color design should consider the emotional demands of different activities, as well as the preferences of different age groups, and should seek to emotionally connect with children. Children's activity site paving color should be coordinated with the overall environment of the living area and children's preference primarily in warm colors, lively, fresh, contrasting, and rich in change. It should not be too bright, so as not to cause visual fatigue, but also should not be too dull, causing psychological pressure on children. The

symmetrical, diffuse, repetitive geometric composition can be used to develop children's divergent thinking, but also cartoons, geographical markers, and other patterns to enhance children's cognitive ability. In general, the color and pattern of children's activity venues should also match the demands of the subject, to set the environment and express emotions.

4.5. Site Elements. Roads, forms, boundaries, areas, nodes, and symbols are examples of design components. They are employed in the landscape to modify space and provide each experience. Although color and texture offer interest and richness to a design, mass, shape, and line are essential for organizing space and creating the framework.

4.5.1. Roads. External roads and internal roads are the two types of roads. These roads should be short and straight, allowing children to join the activity area quickly. Internal roads should be as interesting as possible, or as level and smooth as possible to promote the use of children's vehicles, skateboards, and other equipment. Furthermore, its breadth is typically between 0.8 and 1.5 meters to accommodate demand while also aligning with psychological demands and playing a role in connecting and leading.

4.5.2. Boundary. The border is a type of enclosure that divides the functionality of the area and can be comprised of roadways, trees, architectural features, or other natural limits, which can be visually or physically closed, semi-closed, transparent, or semi-permeable. Figure 14 depicts many sorts of activity site borders.

For adults, borders can separate different activity areas and enhance the connection between areas but for children, borders are a "fun thing" — children like to climb, drill and hide, and borders can meet these needs. The border can be designed with different materials according to different themes of the site to bring different sensory experiences to children.

4.5.3. Area. The area of children's activities should be separated as per diverse types of doings relatively than age groups since it is not "who to play with" but "what to play" that defines whether children's games interfere with each other. The content of activities determines the layout, form, and pavement of the site, and the combination of these elements creates an intelligence of the area in visual and experiential terms, thus enhancing children's sense of security and belonging and avoiding conflicts to a certain extent. Figure 15 explains the enhancing procedure of the sense of regional security through the spatial enclosure.

A private area is owned and managed by a single person, group, or organization. Public space is defined as space that is not only in the public sphere but also owned by the public. Figure 16 highlights the connection between public space and private space.



FIGURE 13: Children's activity site full of color.



FIGURE 14: Different types of activity site boundaries.

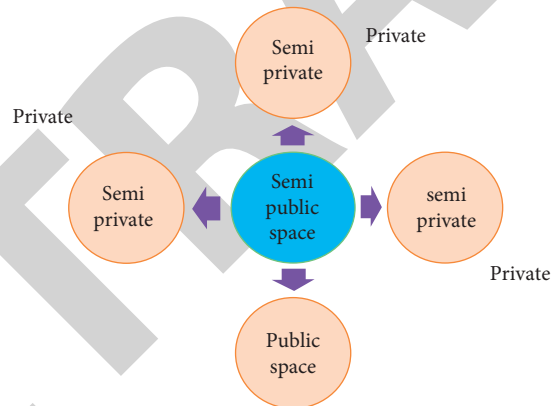


FIGURE 15: Enhancing the sense of regional security through spatial enclosure.

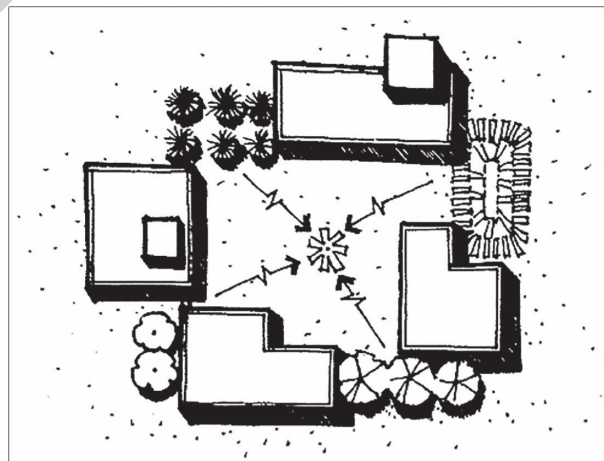


FIGURE 16: Connection between public space and private space.



FIGURE 17: Interesting entrance to the event site.

4.5.4. Node. Because of its modest size, various functions, concentration, and other factors, the children’s activity site is an essential node for the entire residential neighborhood. The most crucial point is the site’s entry and departure. In today’s residential area design, most children’s sites lack apparent entrances and exits and is merely separated by asphalt and activity equipment. However, entrances and exits not only promote and guide, but they can also increase the safety and pleasure of site activities when combined with the design of the boundary to offer youngsters the fun of discovery. Figure 17 shows an interesting entrance to the event site.

4.5.5. Symbols. The sign can be a sculpture, activity equipment, a graffiti wall, or even a special form of paving so that people can know at first sight that the site belongs to the children. With the symbols as the center guiding the theme construction, spiritual feelings, and the formation of a specific environmental atmosphere, leading and dominating the entire activity space. However, it reflects the character of the activity space and emotions so that it not only attracts children’s attention but also becomes the central focus of the residential area landscape design.

5. Conclusions

Through the text investigation of children’s residential areas, this study analyzes the current situation, and existing problems of children’s outdoor activity space and discusses the transformation of children’s outdoor activity space using Artificial Intelligence. Through a survey of children’s residential areas, we analyze the current situation and problems of children’s outdoor activity spaces and explore their renovation. To analyze and explore the planning and design of children’s outdoor activity space, and create an outdoor activity space that meets children’s behavior and psychology. Finally, taking the design of children’s outdoor activity space in residential areas participated by the author as an example, apply the theory to practice, analyze and discuss the planning. Furthermore, it designs children’s outdoor activity space and creates an outdoor activity space in line with children’s behavior and psychology.

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest

The authors declared that they have no conflicts of interest regarding this work.

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