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# Creating a Child-Friendly Environment: An Interpretation of Children's Drawings from Planned Neighborhood Parks of Lucknow City

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**Abstract:** The urban environment is a product of many tangible and intangible factors for communities, involving activities, spaces, and users of different age groups. Stakeholder consultation has become an essential part of envisaging any urban space. In general practice, mostly adults' opinions and suggestions are taken into account, and children are sidelined, even if the issues are related to children. Children are an integral part of the present urbanizing world and are some of its most sensitive and affected users. The United Nations Convention on the Rights of the Child recognizes three P's: provision, protection, and participation. The third, participation, is a crucial dimension of creating a healthier environment, but it has largely been neglected. The drawing technique is among the methods to gather information directly through the children's participatory approach. It has been observed that children prefer to express themselves by drawing rather than answering questions and find it easy and enjoyable. This research incorporates drawing as a methodological tool for identifying children's expectations and understanding their preferences about their ideal neighborhood park. A total of 80 children aged between 6 and 15 years from planned zones of Lucknow city were selected for the research. The results derived from the content and co-relation data analysis techniques highlight that children emphasized physical, perceptual, cognitive, emotional, and social parameters for developing a child-friendly environment in parks and open spaces.



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## 1. Introduction

Urbanization can be defined as the increase in economic activities due to an increase in the population of the urban area. People from one territory migrate to other territories/cities for better jobs and living conditions, expanding the urban fringe areas [1–3] and attracting development and urban transformation [4,5]. This development may not necessarily be related to the needs of the residents, but rather is largely driven by the interests of private builders/developers [6]. This has placed a large amount of pressure on the existing infrastructure, including roads and transportation, social infrastructure, and open green spaces [7]. The life of the residents of these overpopulated cities has become 'modern life', with imbalances in their financial stability, income levels, and everlasting demands. This has also generated inequality between the residents of various income groups as well as different age groups [3].

Such an imbalance is also seen in the planning of the spatial environment, in which children have no voice, as they are not a part of the planning process. This has an impact on their physical and mental health and also reduces their life expectancy. Even children

living in wealthy societies reside in a world that is dominated by adults with hardly any opportunity for playing, independent mobility, or socializing freely with their peers [7,8]. Children are vulnerable to traffic accidents, pollution, epidemics, and violence. Most cities do not offer a healthy environment for raising children to be physically active for better adulthood [9,10]. Children are a universal indicator of the status of human development as well as the level of well-being in society. Kevin Lynch, in *Growing up in Cities*, 1977, states that 'A good City is one in which children can grow and develop to the extent of their powers; where they can build their confidence and become actively engaged in the world; yet be autonomous and capable of managing their affairs' [11].

In India, it can be seen that, in most scenarios, there is a very minimal increase in infrastructure compared to the demand created by an increase in population. Urbanization in India is taking place at a very rapid pace, and this is evident from the fact that the number of towns has increased by more than twofold, from 82 to 202, between 2001 and 2011, as per the census [12]. Therefore, most Indian cities have major urban problems, such as inadequate services of water supply, health facilities, sanitation, power supply, provision of basic amenities [7], and inadequate social infrastructure [13]. These problems have led to a deteriorated environment, unemployment, and congestion [7]. The environment includes the places where children spend their childhoods, exploring cities, neighborhoods, roads and streets, schools and parks, and open spaces [14].

Everyone has been affected by urbanization but especially children. Urbanization has limited the movement of children, and they are generally driven to spaces such as schools or are kept indoors under the supervision of adults [15]. To make a space feel friendly and responsive, user perspectives are of the utmost importance, but, while creating the child-friendly environment, we see a lack of children's views and participation in the discussion process.

Urbanization has also consumed spaces allotted for parks and open spaces in urban areas. Neighborhoods experience a lack of play spaces, accessible playgrounds, safety, and adequate play equipment. These spaces are very important for the overall development of the children, as play is important for performing physical activities. The World Health Organization (WHO) recommends that children aged between 5 and 17 years should be engaged in physical activities for at least one hour daily [8]. Children are observed to not play often and are generally engaged in the digital world. Parents do not allow children to go outside of the home due to safety and to protect them from traffic incidents [16]. This lack of physical activity has a significant impact on children's health and has led to instances of obesity, diabetes, and other health issues [15]. To attract children towards parks and open spaces, there is a need to develop these spaces as per their requirements for a safer child-friendly environment.

Urban planning is the basis for building a safer environment for children and families. Jane Jacobs and Kevin Lynch's theory has a positive effect on community planning. However, there is no proper measure of the positive impact on youth. In a report of global changes [17], it was highlighted that the child-friendly planning of urban spaces could act as a helping hand in achieving the city's developmental goals and tackling challenges by strengthening the links among the built environment, children's well-being, and the public realm. Designing a community space for children is not only about constructing more playgrounds but also the need for quality in those spaces, i.e., it is important to create a child-friendly environment in open spaces or parks [18].

The United Nations Convention on the Rights of the Child proposed the concept of the three P's (provision, protection, and participation) and serves to highlight children's joint participation in all issues related to them [19,20]. Therefore, children should be given priority in deciding the quality of open spaces or parks, as they are the primary users. However, the following question arises: which method is appropriate to determine children's views on a child-friendly environment? There are several methods to identify children's views, such as drawings, essay writing, interviews, questionnaires, records, and behavioral observation. The authors incorporated the children's drawing method to grasp

their perspective on their environment concerning parks and open spaces of planned urban neighborhoods.

This study aimed to determine children's views on the child-friendly environment in the parks and open spaces of planned neighborhoods. The objectives of the study were as follows: (1) to understand children and their relationships with the surrounding environment; (2) to investigate the child-friendly environment; (3) to identify a suitable method to comprehend the views of children by involving them in the research; (4) to explore children's perspectives on developing a child-friendly environment in the parks and open spaces of planned neighborhoods.

## 2. Literature Review

### 2.1. Child Psychology

The literature on child psychology was studied to understand the relationship between children and their surrounding environment. From birth to two years of age, children depend upon their parents. The child's behavior and character are affected by his/her family and home environment. Children also start walking between these ages; therefore, the surrounding environment invites them to walk. When children grow further and attain the age group between three and six years, their dependency upon their parents decreases. They enjoy freedom and express their freedom through games. Children have only basic skills of graphics and language and can represent their feelings symbolically. During the next period, from 6 to 13 years of age, children start to go to school and actively learn by working. They also revise their experiences through games and social activities. Children have command over skills of graphics and language. They have comparatively more freedom, increased interactions with friends and the environment, and can explore places in their neighborhood. The next and last stage is adolescence, i.e., children aged between 14 and 18 years. Children of this age group have better command over cognitive, emotional, and perceptual graphics and language skills. Their range of independent movement is wider, and they have developed an interaction with the environment [16].

Piaget analyzed the way in which children improve knowledge, perceive time, understand space, and count numbers. He found that the progression of transformations responsible for controlling a child's perception throughout the different stages of age depends upon the relationship of the child with the surrounding environment. Freud assumed that child development occurs in phases and depends on the ability to deal with various encounters and challenges throughout these phases. He also concluded that these phases have major impacts on his/her life as an adult and considered that models of human behavior are the result of encounters that happen between the child and his/her surrounding environment [21].

The different psychological aspects in various age groups of children show the deep connection between child development and the surrounding environment. The environment affects a person's attitude, personality, and mood [22]. The most important period of human life is childhood as this is the period that shapes the character of the child. It is also proven that a child does not only need physical care and supervision but also requires social, emotional, psychological, mental development, and other basic factors [22]. Accessing outdoor spaces is very important for the overall development and physical well-being of children [23].

Playing leads to the growth of children's personalities. Through playing, children learn self-satisfaction, self-development, self-esteem, acceptance of rules, self-control, patience, a sense of adventure, creativity, awareness, freedom, power, defense of rights, the ability to control aggression, accuracy, stamina [14], emotional equilibrium, and cognitive and social skills [24].

### 2.2. Child-Friendly Environment

Furthermore, the literature on the child-friendly environment was studied to identify the parameters of a child-friendly environment. In today's world, the planning of spatial

and social environments, including traffic, pedestrian ways, open spaces/parks, and playgrounds do not often take children into account. Playgrounds are static, a place of boredom, and do not cater to their present needs [25–30]. Therefore, children are not provided with healthy, imaginative, and safe environments, where they can be more creative, independent, and socially and physically active. Most cities are not planned for raising children and preparing them for adulthood. ‘The needs of children and youth, particularly with regard to their living environment have to be taken fully into account’ [31]. Therefore, in 2004, UNICEF proposed the concept of the child-friendly city (CFC), which incorporates a system of good local governance committed to the implementation of the convention on the Rights of the Child [32–35]. This convention reinforces the need to defend children’s rights to live in safe, clean, and healthy surroundings and to engage them in activities related to free play, leisure, and recreation with adequate quality of life [36]. It also assures that the ‘Well-being’ indicator of child-friendly cities (CFCs) defines a healthy environment, sustainable development, and good governance [32,37]. Physical, cultural, social, and governance environments can be made child-friendly by involving both young children and authorities [38,39]. Priorities should be given to the needs of children to develop parks, playgrounds, libraries, and museums that stimulate the creativity and mental abilities of children and enhance their physical development [40]. Child-friendly cities have both built and natural spaces [41–43] where children have the fundamental right to play, speak freely [44], and partake in meaningful activities [43] with other children and young people [44–47]. Children also have access to these natural spaces [36,48] and can independently explore their surrounding environment [49]. Therefore, child-friendly cities comprise the creation of an environment where children have the right to be heard and involved in the decision-making process by incorporating their views on a priority basis [33,50]. It is necessary to understand the parameters that are vital for children while creating a child-friendly environment [51].

### 2.2.1. Child-Friendly Environment and Parameters

Parks provide valuable opportunities for children to learn about the natural world, interact socially with friends and family, engage in physical activity, and acquire new skills, such as foundational motor skills [50], that are essential for the physical, social, and mental health of children [52]. The best play environments for children are those that are designed around their natural play requirements, taking into consideration the different types of play. This enables children to engage in different stages of development, such as social, physical, and cognitive forms of play [53].

The important parameters that should be considered for a child-friendly environment include:

- **Physical:** Ecological models state that the health and growth of children are influenced by physical environment characteristics [52]. Facilities and amenities are some of the important elements which make up the physical environment. Encouraging children to visit parks requires maintained facilities and amenities, such as clean spaces, furniture, dust bins, and improved ground conditions [53]. Researchers discovered in a recent study that preferences for physical facilities and amenities change with age. It was observed in the study that older children were more likely to visit larger parks with more amenities [54]. The theoretical framework which describes dimensions related to child-friendly environments states that urban and environmental quality is a part of the physical parameter as a normative dimension [34].
- **Cognitive:** Children discover, explore, and develop an understanding of their surroundings through play [55]. They become well acquainted with the patterns and systems of life and develop cognitive skills as a result of their exploration and experience of social, physical, and natural environments [56]. The use of the outdoors increases with a child’s age, as does their cognitive ability [56]. Children prefer to visit playgrounds with high levels of challenge, adventure, novelty, and complexity, according to research on play varieties [57,58]. They are attracted to play with equipment

and prefer to skate in the park or ride a bicycle [53]. Studies reveal that the number of activities and features present in a park is important for increasing visitation [53,59]. Even insignificant play areas, and a lack of equipment and materials, restrict children's play options, leading to increased boredom and aggressive behavior, as well as a lack of cognitive development [60].

- **Perceptual:** Understanding the perception of children is to identify a process to strengthen children's feelings and improve the space and environment that would help children to grow [14]. In his hypothesis, Piaget states that children pass through various stages while developing perceptual ability. This involves comprehending topological relations, such as with surroundings and their arrangement [21]. Children value nature and see play areas or open spaces as a place to play rather than to relax and interact socially. Playgrounds with good design and planning provide children with a variety of options for achieving various goals [14]. Scientific evidence indicates that park quality [61] is impacted by perceptual design elements, such as paths, trees, and water features. Biotic elements have a large influence on how children learn, especially through play [62]. Children mentioned trees and grassy open spaces as part of their favorite elements in a park [53,57]. Children prefer to have a variety of options in terms of surface, aesthetic, and color [53]. The role of the CFE is critical in enhancing children's engagement with safe and healthy natural environments [63].
- **Emotional:** Environmental factors elicit extreme physical and mental responsiveness in children [64]. Outdoor play can foster a socioemotional support system [21]. Different games have various impacts on a child's emotional development. Wide and open spaces provide them with an opportunity to run freely and release internal energy. Spontaneous games encourage a sense of freedom, power, and the defense of individual rights. They learn to respect social issues and legal rules through group games [14]. Safety is among the most important characteristics of designing a child-friendly environment [55]. The lack of safety and security has resulted in a significant reduction in children's outdoor activities [64]. The presence of the Kit, Fence, and Carpet (KFC) [65] and adults can also boost safety in a play area. The sense of belonging to a place depends upon emotional affinity towards and time spent in nature in childhood, and this is later reflected in the interest of the person to protect the environment [66].
- **Social:** Playing encourages the development of the social context of a child's personality [14]. Researchers have defined sociability as favorable conditions for gathering and interacting. For a child-friendly environment in a neighborhood setting, sociability is a measure of children's ability to congregate, which includes possibilities for children to engage in social interaction [64,67]. It also has a substantial positive influence on the social and mental well-being of individuals [68]. In an observation-based study of children in Australia, 85% of all responses showed children to play or become involved with others (such as peers, parents, or siblings) [69]. A social environment, for example, the presence of friends in a park, has been shown to have an influence on the probability of children engaging in physical activity in the park [70]. According to a study, a lack of friends is an obstacle to a child's participation in physical activity, emphasizing the importance of social interaction with children of various ages [64].

#### 2.2.2. Techniques for Children's Participation in Research

Furthermore, the literature was studied to identify a suitable technique to determine children's views by involving them in research. In the case of selecting an appropriate method for collecting data from children, their skills as per their age play an important role. Children's active participation should be allowed in matters related to their everyday life [16]. It is very difficult to obtain data from children. Therefore, researchers derived an alternative method to gather information about children's views on their environment, their behavior, and their activities by talking to their parents or caretakers. However, the representation of children is generally negligible in this approach for the planning and designing of their environment, as the decision makers are adults who do not understand

children’s perceptions and concepts. This is the reason that children’s environments are not designed as per their physical, cognitive, emotional, perceptual, and social needs. Therefore, these research methods, which can incorporate children’s perspectives and needs, should be adopted for the planning of their own spaces.

The authors studied 75 research papers related to child and environmental research carried out from 1974 to 2019. Figure 1 states that 22% of researchers used interview techniques; 17% of researchers observed the behavior of children; 37% used the drawing technique; 19% preferred both interviews and observation; and 5% of researchers used combined interview, drawing, and observation techniques for child-related research. Furthermore, 42% of researchers (37% of ‘drawings’ and 5% of ‘Interviews and drawings’) used ‘Drawing methods’, as drawing is the only method in which children are involved directly and primary data can be extracted from the primary source itself.

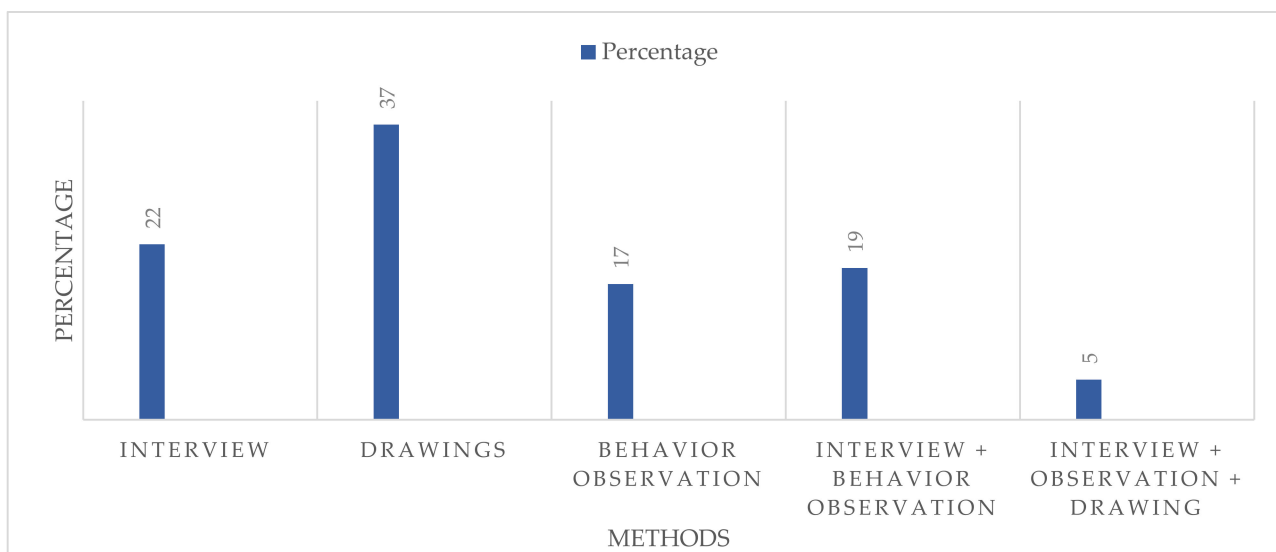


Figure 1. Data collection method related to children (source: authors).

Figure 1 shows various research methods. Different researchers have used different methods for their research on children. These methods can also be defined as per the age of the children. This means that they are appropriate methods for collecting the data from children according to their age.

Methods used for data collection as per the age of the children are given in Table 1.

Table 1. Techniques used for data collection related to children (source: authors).

S.No.	Stage of Development	Research Methods	Research Works and Authors
1	Infancy (0–2 years old)	Behavior Observation/Structured Interview of Parents and Caretakers	Disabled Children [71]; Children’s behavior and playground Environment [72]; Health [73]; The effect of color and space [74]; Daycare design [75]
2	Preschool Children (2–6 years old)	Behavioral Observation/Structured Interview	The effect of playground design [76]; Housing preferences of Children [77]; Children’s activities and experiences in outdoor spaces [78]; Affective characterization on the size of children’s drawings [79]; Children’s and young people’s perceptions [80]; Children’s perception on emotional well-being [81]; Natural playscapes [82]

Table 1. Cont.

S.No.	Stage of Development	Research Methods	Research Works and Authors
3	School-age Children (6–13 years old)	Structured Interview/ Behavior Observation/Drawings/Essay Writing/Reports	Observe privacy-seeking environment [83]; Children centered research methods [84]; Children’s behavior on schoolyard [85]; Changes in children’s access to their neighborhoods [86]; The effect of playground design [87]; Outdoor activities and place properties [88]; Children’s activities and experiences in outdoor spaces [78]; Children’s environmental perceptions [89]; Establish variability in children’s access [37]; Participatory process for constructing better environment [90]; Risk perception [91]; Relationship between residential density and psychological health [92]; Children’s representation about themselves & others in their drawings [93]; Environmental friendliness of children’s environment [94]; Games based learning [95]; Children’s perception of play spaces [96]
4	Adolescents (13 years old or above)	Structured Interview/ Behavior Observation/Drawing/Essay Writing/Reports	Relationship between children’s activities and their surrounding neighborhood environment [97]; Methods, Tools and Instruments [98]; Risk perception [91]; Environmental friendliness of children’s environment [94]; Children’s and young people’s perception [95]; Design and plan all public urban spaces keeping children in mind [99]; Meanings children attached to natural spaces and their impact on their subjective well-being [41]; Natural Environment and Child-Friendly Cities [41]

As this research target group is children aged 6 to 15 years, to obtain children’s views directly, the ‘Drawing’ method was chosen [100–102].

#### Children’s Drawing

Children’s drawings reflect an image of his or her mind as these provide a ‘window’ into their thoughts and feelings. Children are usually shy by nature and find verbal expression far more difficult; therefore, drawing tests are quick, easy, and enjoyable [103].

Drawing results from visual methods were initiated and developed predominantly by researchers who worked on environmental psychology. This was in line with the ‘Place Perception Project’, which was devised by James Blaut and David Stea of Clark University in the 1970s. For this approach, aerial photographs, maps, and sketch maps drawn and produced by children are taken into account. These are analyzed using the Kevin Lynch principles, which were proposed in 1960. This became a special tool for understanding the development of the terms of spatial cognition and awareness among children. Environmental psychology researchers helped in establishing the variations existing in environmental knowledge according to children’s age and sex. This brought Piaget’s hypothesis into question, which has been developed into many stages over the years and focuses on various stages of child development. Earlier existing methods were criticized due to the strictness imposed by the researchers. The controlled environment left very little space for children to express themselves. Strict protocols lead to the interpretation of children’s expression (in any form) to become adult-centered, which removes the original essence of the exercise [104,105].

Since the 19th century, many scholars and researchers have been trying to interpret children’s drawings; the main reason for this kind of study has been divided into three categories: educational, clinical, and aesthetic. The analysis of the emotional expressive aspects of children’s drawings can only be carried out in three different ways.

First, drawings were reviewed as a symbolic representation of personality traits, inferred primarily by Freud, well within the conceptual framework of psychoanalytic theory and its derived products. The second, recognized primarily in the work of [106], intended to formulate and empirically justify the categorization of ‘emotional indicators’

in children's drawings. Instead of personality assessment or medical diagnosis, the third category is associated with how normal children portray personally relevant or emotionally substantial topics [107]. Children's drawings were analyzed to understand their further viewpoints on major modern and future challenges.

The cultural environment plays a vital role in the understanding of children, as studies suggest that the cultural envelope around children and the environment influences the drawings of the children. Children's drawings can be said to develop in two ways, inherent/universal factors that grow according to an intrinsic development program, and factors due to the environments in which people live and the learning culture environment focused on the development of their skills and abilities. It is possible that drawings are also a reflection of children's intellectual development. It should be noted here that drawings do not only bring clarity, but the concept of these drawings defines the intellectual level of the individual [108].

Perception analysis of children's drawings has always been seen as a methodical means to evaluate children's opinions and experiences toward their surrounding environment. According to numerous studies, children's drawings encompass indicators of a variety of problems as well as solutions.

As mentioned in a few research papers, various scholars have worked on children's drawings to decipher children's psychology, such as in [109], in which children's drawings (aged 11 to 15) were utilized to divulge their adjusting perceptions toward nuclear plants [110] using an unrestricted mapping technique. Matthews used children's drawings (aged 6 to 11) to depict their journey to academic and personal stages. Drawings from children between the ages of 5 and 15 were used to explore the spectrum and types of concerns children may have towards the environmental crisis [111]. She told children to draw a picture of what it signifies to them when they are told, 'You must save the planet'. She observed that around 87% of the children were highly conscious of the environmental crisis. Almost half of these respondents (47%) depicted themselves or others taking personal action to affect positive social or environmental change.

Ethical problems for the research related to children can be overcome by using participatory methods, such as drawing [112]. Alerby studied 109 children's drawings to determine their thoughts about the prevailing environment [113]. Burkitt and Barrett investigated drawings of 258 children between the ages of 4 and 11 to establish that children drew positively characterized topics larger [114]. Clark revealed how children valued the use of outdoor space by the children's drawings method [115]. It was analyzed that children's drawings help to determine their perspectives on their lives [116]. Faokhi and Hashemi also analyzed children's drawings to identify children's views on social, emotional, physical, and psychological aspects [108]. Oguz investigated children's drawings in detail and discovered that these can be grouped into child-specific factors, such as intelligence, motivation, psychology, and other environmental factors [117]. Bland used colorful data sources of children's drawings with explanatory written text to determine their perceptions of the school environment [101]. Labintah and Shinozaki interpreted children's drawings to determine the importance of outdoor environmental education [118]. Unal analyzed children's drawings to determine sports brand awareness among children [119]. Kim conducted research with children as the primary investigators and concluded that this may be achieved through children's participation in research activities through drawings [120]. Snow studied the children's drawings method to determine girls' views of the ideal school playground environment [121]. Gökmen & Menconi used the children drawing method to investigate whether nature is an important aspect in the creation of child-friendly cities [122,123]. Catherine Kaplun captured children's views of transformation to school through a thematic analysis of children's drawing with explanatory narratives [124]. Loureiro also explored children's drawings to improve the school environment as per children's perspectives [125]. The drawing approach reflects children's imagination and their creativity, worries, concerns, and feelings [126].



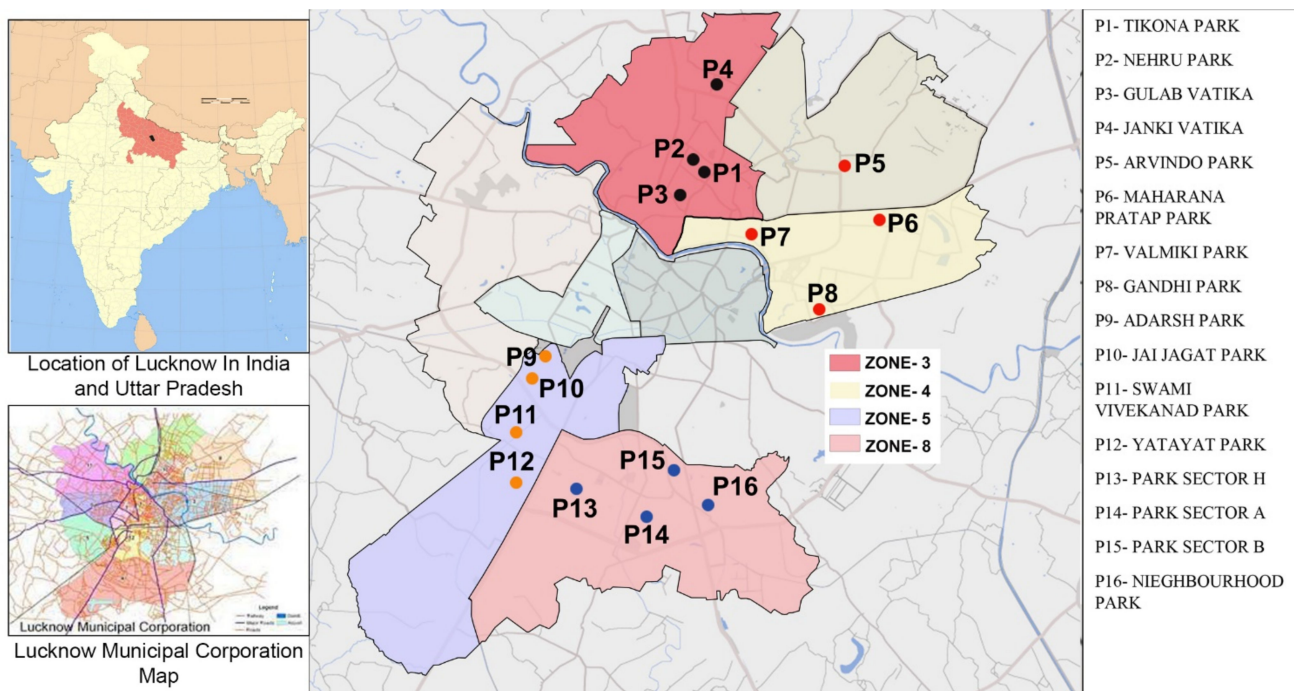
### Advantages of Children Drawing Method

There is a paradigm shift in research related to children in new methods of generating primary data, i.e., visual methods, such as video diaries, mapping exercises, photo-voice, or drawings, as these reduce the need for language skills and facilitate a nonverbal approach [106,127–129]. The children's drawing method can be used for exploring children's views of major problems in the world today or in the future. These drawings accompany their development stages of motor, emotional, psychological perception, and social skills. This is the same medium of expression as play and speech. They can freely express their fears, joy, dreams, and pain, etc., through drawings, on one hand, and on the other hand, they can transmit strong positive or negative messages. Drawing as an assessment is an effective instrument since most children enjoy drawing and show no evidence of friction while doing so. Although most children dislike responding to questions, drawing tests are efficient, easy, quick, and enjoyable [103]. 'It is universally acknowledged that the composition and content of children's drawings may provide clarity into their emotional responses about the world'; this was established by studies according to Crook [130]. Drawings not only provide familiar tools and materials but also enable children to control their engagement in the data collection process without direct eye contact with the researcher. These also encourage children to take time to respond to the question, and they can convey their perspectives through a combination of verbal and nonverbal means [116] even better than adults [120]. Drawings by children provide us with a 'window' into their feelings, thoughts, and emotions, primarily since they represent an image of the child's mind [124,131,132]. Drawing methods more quickly and easily capture social data from and about children [108]. Children's perspectives and interests are understood through research that uses visual methods [108]. Drawing can help children share more relevant knowledge [124,133]. The utilization of drawings is an efficient method of research with children [134,135]. Drawing allows children to display emotions and better experiences that they have not been able to describe or communicate [126,136]. Children contribute a significant amount of their time to drawings and paintings; therefore, psychologists can easily explore their views and perceptions through these [137,138].

### 3. Research Method

#### 3.1. Site Context

Lucknow city was taken as the site for this research. Lucknow is the capital of Uttar Pradesh, which is India's most populous state, as shown in Figure 2. After New Delhi, it is North India's largest and most developed city. Therefore, it was selected as the site for this study, and outcomes can be implemented in other cities with the same characteristics and socioeconomic structure. Lucknow District and Lucknow Division both have their administrative headquarters in this metropolis. Lucknow has long been regarded as a multicultural city that has thrived as North India's cultural and artistic capital. With a population of over 2.8 million, the city is spread across both banks of the River Gomti, covering 350 km<sup>2</sup>. Lucknow's urban population accounts for 6.33% of the state's total. The city is known as the seat of the Nawabs and for its heritage character [139]. The city is divided into eight zones by the municipal authority for various physical and social infrastructural developments, as shown in Figure 2 [139]. Children were selected from the park list provided by Lucknow Municipal Corporation, out of which 16 parks with an area of more than 5000 m<sup>2</sup> were taken into account for research. The rationale to select these parks was based on the availability of the area, and the further scope for parks to be planned, developed, and designed as per the wishes of children. Parks of only planned zones (Zones 3–5 and 8) were considered for the research work, and zones (Zones 1, 2, 6, and 7) with old settlements or outskirts areas were not considered in this study.



**Figure 2.** Location of 16 neighborhoods in planned zones of Lucknow; source: authors (generated through secondary resources).

### 3.2. Detailed Methodology

This study selected ‘Drawing’ as a tool for collecting primary data from the children aged between 6 and 15 years old. A total of 80 children were selected from different neighborhoods of planned zones of Lucknow. Five children of defined age groups were selected from each of the 16 neighborhood parks as per Table 2. This age group of children was selected as they can express their thoughts and opinions through drawings as per Table 1. They also have the desire for their drawings to reflect the actual image of a real picture or photograph [119,140,141]. Children were asked to draw a neighborhood park in which they wished to play. They were briefed on the purpose of this research before starting the drawing exercise. They were also told about materials they could use for the exercise [118]. Children were required to draw on A4 paper to facilitate computer scanning. They were given the option of black and white or color drawings. Children were given full freedom to draw and express themselves [108].

**Table 2.** Sample size (source: authors).

S. No.	Age of Children (In Years)	No. of Children Selected (One from Each Selected Neighborhood)	Location
1	6 and 7	16	From 16 defined neighborhoods of planned zones of Lucknow
2	8 and 9	16	
3	10 and 11	16	
4	12 and 13	16	
5	14 and 15	16	
Total Number of children		80	

Oral consent for participation was obtained from children, and they were also made aware that they could leave at any point and their identity would be kept confidential [112,126]. The United Nations, advocating for children’s participation rights [142] in the ‘Primary Key’ to ethical research [124], stated that researchers should understand

children's body language, respect their concerns about not participating, offer breaks if children become restless, and allow them to leave if they wish to [124]. These suggestions were followed when conducting the research.

They were also asked to write up some notes explaining their drawings to support the analysis. Many research scholars have collected such written notes to avoid any biases during the analysis process [101,116,124,125]. All the drawings were discussed with a panel, consisting of five psychologists [55]. The experts were selected randomly from the list of city psychologists and pediatricians, who provided their concerns for the study. Expert 1 is an associate professor in the Department of Humanities and Social Sciences at a university. She has completed a doctorate in the subject. She also works as a certified cognitive behavioral therapist and mindfulness trainer. Expert 2 is a practicing clinical and counselling psychologist with over 15 years of experience. Expert 3 is a trained rehabilitation psychologist with a Ph.D. in psychology. Expert 4 is an academician and works as an associate professor at a university. She holds a Ph.D. in clinical psychology and has 15 years of field experience. Expert 5 is a pediatrician by profession. He is an M.D. in psychiatry and works as an associate professor and consultant for child and adolescent psychiatry at a medical college. Content analysis of all the drawings was carried out by coding identical features among the drawings [118,119,121,127,142,143]. The main aim of the analysis was to consider the most emphasized features identified by the children. This was again constantly verified by the written information provided by the children for proper validation. The most prominent features that appeared and were identified in the drawings and written tests were noted. While interpreting the drawings, experts kept the coding of drawings and written material separate so that children's ideas and the researchers' standpoint would not match before analysis. This generated an unbiased result. Different structures and patterns were gradually crystallized during the analysis of drawings [113], and they were grouped into potential categories based on similarities [121].

#### 4. Results

As a part of the exercise, a total of 80 responses were received. Some of them are shown below in Table 3. These responses were first sorted based on their age group. Furthermore, various items drawn in each drawing were recorded in two ways. The first one was frequency mapping based on a number of participants' drawings as per various categories. In this way, frequency mapping of participants was conducted, as summarized in Table 4. Similarly, content analysis with the help of frequency mapping using a number of elements drawn was carried out; for example, there are 16 children in each group, so in 16 drawings, the total number of trees drawn in all drawings, e.g., children aged between 6 and 7 drew 35 trees, and those aged between 8 and 9 drew 32 trees. In this way, frequency mapping using the number of elements drawn was performed as per Table 5.

**Table 3.** Drawings by respondents (children); source: authors.



Sample 1, Class VIII, 13 years old



Sample 2, Class III, 9 years old

Table 3. Cont.

Nature: trees, shrubs, water ponds, and ducks; diversity: surface variety and plant variety; aesthetics: colors and form and shapes; amenities: drinking water, fountains, and cycle tracks; play varieties; social interaction between different age groups of children.



Sample 2, Class IV, 9 years old

Nature: trees, shrubs, grass, and flowers of different colors; diversity: surface variety and plant variety; aesthetics: colors, forms, and shapes; play varieties: slides and swings; amenities: benches; social interaction among the different age group of children.



Sample 4, Class VIII, 13 years old

Nature: trees, shrubs, grass, and flowers of different colors; diversity: surface variety and plant variety; aesthetics: colors, forms, and shapes; play varieties: slides of different varieties are given in the drawing.



Sample 5, Class VI, 11 years old

Nature: trees, shrubs, water pond, sand, and flower beds; diversity: surface variety—grass, pavement, stone, and plant variety; aesthetics: colors, forms, and shapes; amenities: kiosks, lamp posts, benches, water, fountains, and cycle tracks; play varieties; social interaction



Sample 6, Class II, 7 years old

Nature: trees, shrubs, grass, and diversity: surface variety and plant variety; aesthetics: colors, forms, and shapes; play varieties: slides and swings; amenities: dustbins, sculptures, and benches.

Nature: trees, shrubs, grass, flowers of different colors, stones, pond, and fish; diversity: surface variety; aesthetics: colors, forms, and shapes; amenities: dustbins, sculptures, drinking water, dustbins, first aid boxes, lamp posts, and social Interaction.



Sample 7, Class IX, 15 years old



Sample 8, Class V, 7 years old

Nature: trees with fruits, shrubs, grass, flowers, and birds; diversity: surface variety and plant variety; aesthetics: colors, forms, and shapes; play varieties: slides and swings; social interaction.

Nature: trees, shrubs, grass, and flowers; diversity: surface variety and plant variety; aesthetics: different shapes; play varieties: slides and swings; social interaction; amenities: benches.

**Table 4.** Content analysis of drawings by respondents (source: author).

SN.	Parameters	Sub-Categories	Drawing Details	Frequency
1	Physical	Amenities and facilities	Benches/Furniture	27
			Lampposts	21
			Dustbins	17
			Walking track	28
			Cycle track	24
2	Cognitive	Play varieties	Play Equipment	72
			Football	26
			Skating	15
			Badminton	27
			Running	27
			Sandpits	14
			Exercise	18
			Adventure	25
3	Perceptual	Biotic elements	Trees	45
			Flower Beds	12
			Stones	10
			Water Ponds	7
			Birds	29
		Diversity	Ducks	3
			Butterflies	3
			Surface	24
		Aesthetics	Plant	24
			Color	27
Form and shape	21			
4	Emotional	Safety and security	Boundaries	34
		Freedom of movement	Presence of adults	32
		Affection and Regards	Space covered in drawings	34
			Happiness on the faces of children	25
			Space emphasized by enlarging	26
5	Social	Social interaction	Children	37
			Adults	15
			Old people	13

The following parameters were indicated by the children in their drawings as per the frequency Table 4.

The purpose of the study is to explore children's views about developing a child-friendly environment in the parks and open spaces of the planned neighborhood. The methodology adopted was to identify various parameters of a child-friendly environment applicable to different age groups of children. The results were recorded under five parameters and their sub-categories as elaborated in above Section 2.2 and indicated in Tables 4 and 5. As per the frequency mapping [144] using the number of elements drawn in drawing, cognitive is the most important parameter for a child-friendly environment followed by the perceptual parameter. Then, emotional, physical, and social parameters were ranked, respectively. Further analyzing these parameters age-wise, it is evident that the frequency of items drawn increases in each parameter with the increase in age, except for the perceptual parameter.

**Table 5.** Content analysis of drawings by number of items drawn (source: authors).

SN.	Parameters	Sub-Categories	Drawing Details	Age (in Years)							
				6 and 7	8 and 9	10 and 11	12 and 13	14 and 15			
1	Physical	Amenities and facilities	Benches/Furniture	8	11	16	22	26			
			Lampposts	11	8	7	18	20			
			Dustbins	11	8	6	14	12			
			Walking track	8	10	11	24	32			
			Cycle track	2	14	12	18	26			
2	Cognitive	Play varieties	Play Equipment	71	65	60	51	48			
			Football	8	13	18	20	21			
			Skating	1	5	11	17	12			
			Badminton	12	17	15	19	21			
			Running	5	10	12	26	31			
			Sandpits	17	15	8	2	1			
			Exercise	10	7	10	12	15			
			Adventure	16	11	14	17	19			
			Trees	35	32	27	30	26			
			Flower Beds	13	11	16	11	9			
			Stones	4	3	6	9	7			
			3	Perceptual	Biotic elements	Water Ponds	5	2	3	4	2
						Birds	22	19	16	14	17
Ducks	1	1				2	2	0			
Butterflies	2	3				1	1	0			
Diversity	Surface	15				22	17	16	19		
	Plant	23				27	19	22	19		
Aesthetics	Color	27				24	21	23	14		
	Form and shape	24	19	17	16	17					
4	Emotional	Safety and security	Boundaries	15	21	16	37	42			
			Presence of adults	7	11	15	29	33			
			Freedom of movement	Space covered in drawings	17	14	16	25	28		
				Happiness on faces of children	17	16	17	22	26		
			Affection and Regards	Space emphasized by enlarging	19	16	12	14	16		
5	Social	Social interaction	Children	29	27	26	31	34			
			Adults	6	6	7	12	14			
			Old people	2	5	7	14	12			

## 5. Discussion

As per the experts, a continuous increase in the drawing details is due to the increase in children's age, better perception, acquired skills, and development factors that make them more capable of expressing themselves in a more detailed manner [21]. At the early age of 6–8, natural spaces, such as water bodies, animals, and trees, make up the most important spaces of children drawing, which are representative of the perceptual parameter [14]. It is well documented in research that around the age of 9 years, children start acquiring independence. In the initial phase during this period, they develop cognitive skills [24]. The co-relation matrix between age and parameters shows that with the increase in age, the cognitive parameter increases most significantly with a value of 0.963102127 out of 1, as mentioned in Tables 6 and 7.

The experts suggested that as the children grow up, they begin to pay more attention to physical activities, develop a sense of freedom, and are concerned with particular characteristics rather than perceptual things. Taking inference from the correlation matrix as per Tables 6 and 7, the perceptual parameter is inversely related to the increase in age. Moreover, it is evident from Figure 3 that although there is a continuous decline, a major decrease in the perceptual parameter was recorded after the age of 9 years when they develop cognitive skills.

**Table 6.** Correlation matrix of age and parameters (source: author).

	Age	Cognitive	Perceptual	Emotional	Physical	Social
Age	1					
Cognitive	0.963102127	1				
Perceptual	−0.956140789	−0.859585551	1			
Emotional	0.897075541	0.972083596	−0.770287198	1		
Physical	0.942163227	0.985822549	−0.832531613	0.992219919	1	
Social	0.921823545	0.991225473	−0.793743057	0.990584277	0.988898885	1

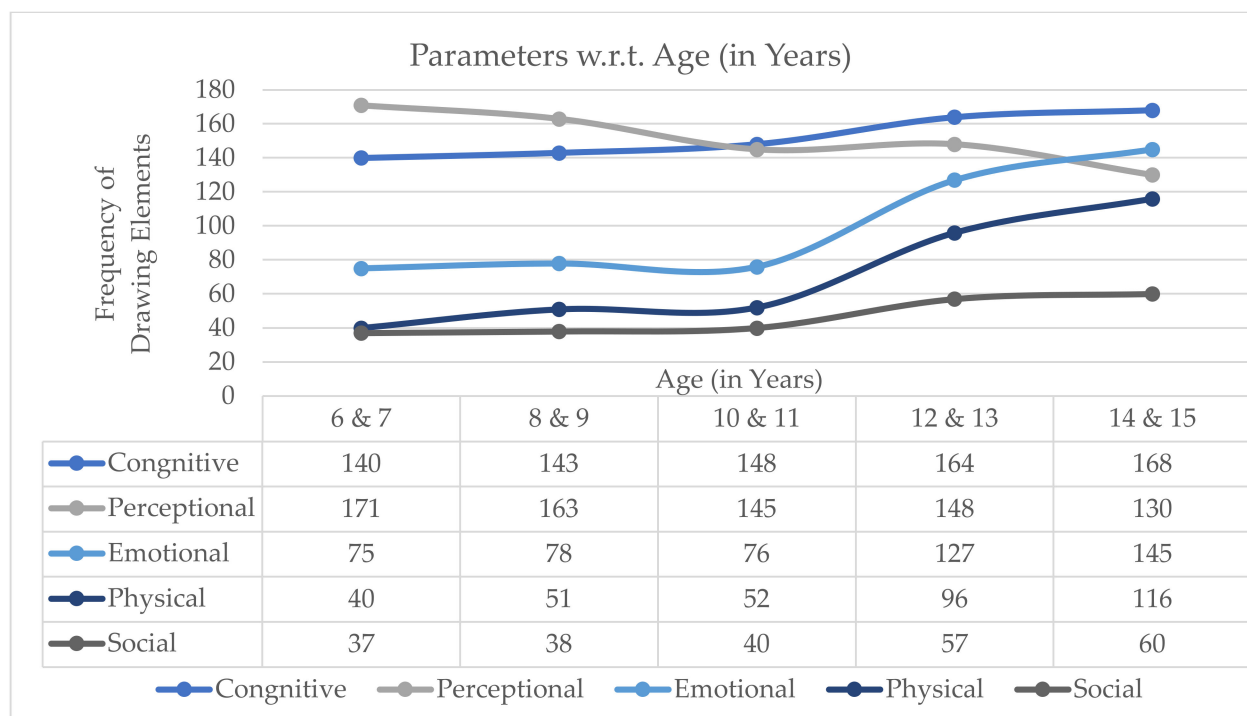
Value (−ve) : negative correlation; value (+ve) : moderately positive correlation; value (+ve) : highly positive correlation.

**Table 7.** Correlation matrix of age withdrawn items under each parameter (source: authors).

Parameter	Sub-Categories	Drawing Component	Correlation Value (w.r.t. Increase in Age)
Physical	Amenities and facilities	Benches/Furniture	0.994834328
		Lampposts	0.751559378
		Dustbins	0.396059017
		Walking track	0.934685168
		Cycle track	0.938194187
Cognitive	Play varieties	Play Equipment	−0.991769407
		Football	0.960667141
		Skating	0.858629663
		Badminton	0.905357460
		Running	0.966705228
		Sandpits	−0.974583184
		Exercise	0.804084401
		Adventure	0.496138938
Perceptual	Biotic elements	Trees	−0.860662966
		Flower Beds	−0.478091444
		Stones	0.794719414
		Water Ponds	−0.48507125
		Birds	−0.777713771
	Diversity	Ducks	−0.188982237
		Butterflies	−0.832050294
		Surface	0.113960576
	Aesthetics	Plant	−0.619750683
		Color	−0.876919233
Emotional	Safety and security	Form and shape	−0.837529886
		Boundaries	0.887000241
		Presence of adults	0.970725343
		Space covered in drawings	0.852056336
		Happiness on faces of children	0.887065525
Social	Social Interaction	Space emphasized by enlarging	−0.48507125
		Children	0.689730495
		Adults	0.92966968
		Old people	0.926371019

Value (−ve) : negative correlation; value (+ve) : moderately positive correlation; value (+ve) : highly positive correlation.

There is a sharp increase in play varieties, such as running, football, badminton, and other physical activities, which forms the basis of an increase in cognitive parameters, as indicated by Figure 3 and Table 5. With the increase in age, children prefer to be involved in adventure play. In the research carried out by the group of researchers in 2015, it was inferred that the average period of stay increases by 50% in a playground that offers adventure play as compared to traditional settings in parks. The median length of stay on an adventure playground was higher than that of the traditional playground [145]. Elements such as sandpits, which are part of cognitive parameters but associated with perceptual parameter elements, also see a decline in preferences for biotic elements, aesthetics, and diversity.



**Figure 3.** Frequency of parameters concerning age.

As the children reach the age of 11, their second phase of development takes place, where a new phase of stability is observed [24]. This stability is frequently seen in the aspects of emotional and social parameters. Figure 3 and Table 6 indicate a major increase in the frequency of elements drawn, which are covered under the emotional parameter. Moreover, the correlation matrix shows that this is due to the increase in the demand for safety and security, emphasizing boundaries around the play area and the presence of adults. Children in age groups of less than 10 years focus more on biotic elements and play equipment rather than safety and security. As per the experts, this does not imply that children of this age assign less importance to safety, security, or happiness, but they fail to express themselves due to less developed skills. Children of these age groups require extra care, security, and safety. The various literature has stated that this is due to children's inability to express the visibility of some important elements, displaying less elements that are not important to them [146].

Regarding the physical parameter, which is found to be the fourth most important parameter, good facilities are required to provide exposure and opportunities for a variety of activities, including cultural and physical activities [147]. When compared to younger children, older children of more than 9 years old were more likely to visit larger parks with more amenities [54]. This is evident from the correlation study that children seek more amenities and facilities with an increase in age. The most significant factor among all of them is playground furniture. Here, surprisingly, results show that with an increase in age, children pay less attention to the cleanliness of facilities. The experts explain this as a case specific to the Indian context only.

Lastly, regarding social parameters, according to Piaget, mental development is influenced by social exchange or effective interaction with others, particularly parents, teachers, and playmates [14]. In the study, it is noted that with an increase in age, especially after the period of the second phase of development, there is an increase in the frequency of social interaction elements in drawings by children. According to experts, this can be translated as how comfortable they feel in a social interaction. Different age groups show a distinct pattern. In Group 1 (6–9 years of age), children feel more comfortable in interactions with the same age group, whereas Group 2 (10–15 years of age) is comfortable with all the age groups, but dominantly the older ones.



As a finding of the study, it is inferred that children's perspectives on a child-friendly environment can be categorized broadly into two groups. Group 1 includes children aged 6–9 years, and Group 2 includes children aged 10–15 years [21]. The children of Group 1 seek a child-friendly environment with more elements of perceptual parameters, such as biotic elements, aesthetics, and diversity. They are more focused on play equipment and are less focused on facilities and amenities. They require safety and security as a part of a child-friendly environment but are unable to communicate this. They also seek to interact with children of their age group only. However, children belonging to Group 2 develop cognitive skills and become more stable by this age, so perceptual factors, such as biotic elements and aesthetics, become less important to them, and they desire more play varieties, facilities, and amenities. They show strong evidence of emotional parameters including the traits of security and safety, a sense of belonging to a place, and freedom. They also assigned importance to interactions with elderly people under social parameters.

## 6. Conclusions

Child-friendly environments are essential to the development of a child at various stages. They have a positive impact on the child's growth process [32]. This study concluded by identifying children's perspectives on the child-friendly playing environment, which has cognitive, perceptual, emotional, physical, and social components. The consideration of these identified components by children's participation will not only enhance the quality of parks and open spaces but also attract children to play there, leaving the digital world at home, which will boost their overall development. It is very important to understand user perception to make any space more responsive and interactive [51,148]. Perceptions of children vary between adolescents and also within children of various age groups [22]. Drawing has evolved as a suitable method for understanding children's preferences, and this approach has been followed in many studies in the past, as elaborated in Section 3 [106]. The exercise undertaken in the study shows that children are comfortable in producing drawings to express themselves [103]. Interpreting children's drawing in various parameters, namely, physical, social, perceptual, emotional, and cognitive, has resulted in understanding their preferences for their environment. From the results, it was also inferred that children's development happens in stages, and their preferences change as per their stage of development [21]. Until the age of 9, they are more oriented towards perceptual elements, and after reaching the age of 9 years, they start developing cognitive skills and become more stable by the age of 13 [21]. This gives rise to the need to develop child-friendly play spaces in such a way that integrates basic facilities and the segregation of some spaces as per the needs of each age group. A child-friendly environment should include amenities and facilities that are basic and preferred by children [53]. It should provide a variety of play options, biotic elements, diversity in color, and surfaces with good aesthetics. This will help to benefit the children in their growth [70]. Furthermore, providing proper safety, security, and the presence of adults will make the play space more secure and increase social integration [55].

This study gathered children's views on their ideal neighborhood parks and open play spaces. The interpretation of drawings identified components responsible for the overall development of the children, which are collectively new findings. These views or components can be included in the policies of local government authorities related to designing, developing, and planning parks and open spaces. Further research work can also be performed in creating a child-friendly environment in health, recreational educational, and urban transport.

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