



Research article

## Design Guidelines for Outdoor Children-Friendly Play Spaces

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### ABSTRACT

In the urban setting, children face several problems that prevent them from having a normal childhood, such as excessive traffic congestion, rapid urbanization and lack of open spaces. Recently, child-friendly urban design has been receiving a significant attention because of its exceptional benefits which include realizing children's demands and preferences. Creating secure, children-friendly play spaces contributes to preventing children from crimes and traffic injuries while at the same time promoting their creativity and enhancing their communication abilities. This paper discusses the topic of child-friendly play spaces which have a major positive impact on children's quality of life, health and growth. For this purpose, the study follows a theoretical approach through understanding childhood and play concept. It highlights the importance of creating outdoor play spaces for children. Also, the study presents the main characteristics and design principles of children-friendly play spaces. This is followed by an analysis of related examples. The expected outcomes of this study is to introduce an adapted design paradigm for safe children-friendly play spaces. The study aims to create outdoor urban spaces with children's needs in mind and fulfill their rights in a comprehensive manner which can lead to sustainable communities.

### Introduction

The rapid pace of urbanization, coupled with high traffic density and scarcity of open spaces, poses significant problems for children in urban environments, hindering their ability to experience a normal childhood. This issue has garnered an increased attention, as child-friendly urban design offers substantial benefits by addressing the needs and desires of children within urban settings. Creating secure, children-friendly play spaces not only protects children from traffic injuries and crimes but also stimulates their imagination and fosters their communication skills. Urban planning has historically overlooked the specific needs of children and young people, who are unable to advocate for themselves. It is crucial to support initiatives that prioritize the needs of children in urban environments, considering their psychological, functional, social and aesthetic requirements. Often, authorities fail to provide adequate open play spaces due to budget constraints and a lack of foresight in urban planning. However, there is a growing global trend towards designing urban play spaces that are children-friendly, aiming to create successful cities that cater to all residents.

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Children in industrialized and relatively developed cities often face numerous problems, including living in crowded, unsafe and polluted environments that lack facilities for learning, playing and recreation. Rapid urbanization exacerbates inequality, with different community sections unable to equally benefit from urban amenities. Cities, overwhelmed by urbanization challenges, fail to meet the needs and expectations of children, preventing them from safely spending time outdoors. A responsive and livable urban space, however, is child-friendly in every aspect. Children, like adults, have the right to actively participate in the community.

There is a notable shortage of studies focusing on developing outdoor play spaces to become children-friendly through children's participation and understanding their needs. In 1955, 27% of the world's children lived in urban areas, a figure that increased to 43% by 2005 (UNICEF, 2012). The United Nations estimates that by 2025, children will make up 60% of the world's urban population (Krishnamurthy, al., 2018). This significant demographic shift underscores the urgent need for designing urban play spaces with children in mind.

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This study is particularly relevant as it is projected that by 2050, approximately about 70% of the urban population will live in cities, with the majority being under the age of 18 (United Nations, 2014). Today, over one billion children already live in urban areas (Nations Children’s Fund, 2013). Addressing neglected urban spaces and redesigning them to be children-friendly can significantly contribute to urban development, especially in outdoor spaces designed to meet children’s needs. Children desire the freedom to play outdoors, the ability to move around safely, and the opportunity to explore the natural environment.

The study assumes that by following the activity needs of children and young people in the outdoor play spaces integrated with the design principles of designing children-play spaces will fulfill children’s requirements and enhance their life psychologically, socially, functionally and aesthetically.

Thus, the study poses several questions, what contemporary play space (such as playgrounds) misses? Do they meet their today’s users’ expectations? Could children there develop their physical and mental skills? How can we create an environmental children-friendly play spaces that meets children’s needs?

Accordingly, this research investigates the importance of outdoor play spaces for children and young people,

focusing on designing safe urban spaces that are essential for children’s play and activities. The study is divided into three parts: a literature review that explains the concept of childhood and play. Also, it discusses the importance of outdoor play spaces for children and young people emphasizing the significance of such environments in enhancing their life, health and growth. Also, it highlights the children’s activity needs and their interaction with the outdoor environment aiming to identify the essential design features for children-friendly outdoor play spaces. This is followed by an analytical study of relevant examples which leads to the conclusion part that includes the main children’s perception of their needs in outdoor play spaces to reach strategic design guidelines for creating children-friendly outdoor spaces that respond and fulfill their needs ensuring that their rights are comprehensively addressed (Figure 1).

The main aim of the study is to highlight the great importance in understanding of the children’s experiences of outdoor play areas in high-density communities to explore the main design guidelines and principles of children-friendly outdoor play spaces to meet children’s needs as target users, ensuring their healthy development and well-being facing of urban challenges.

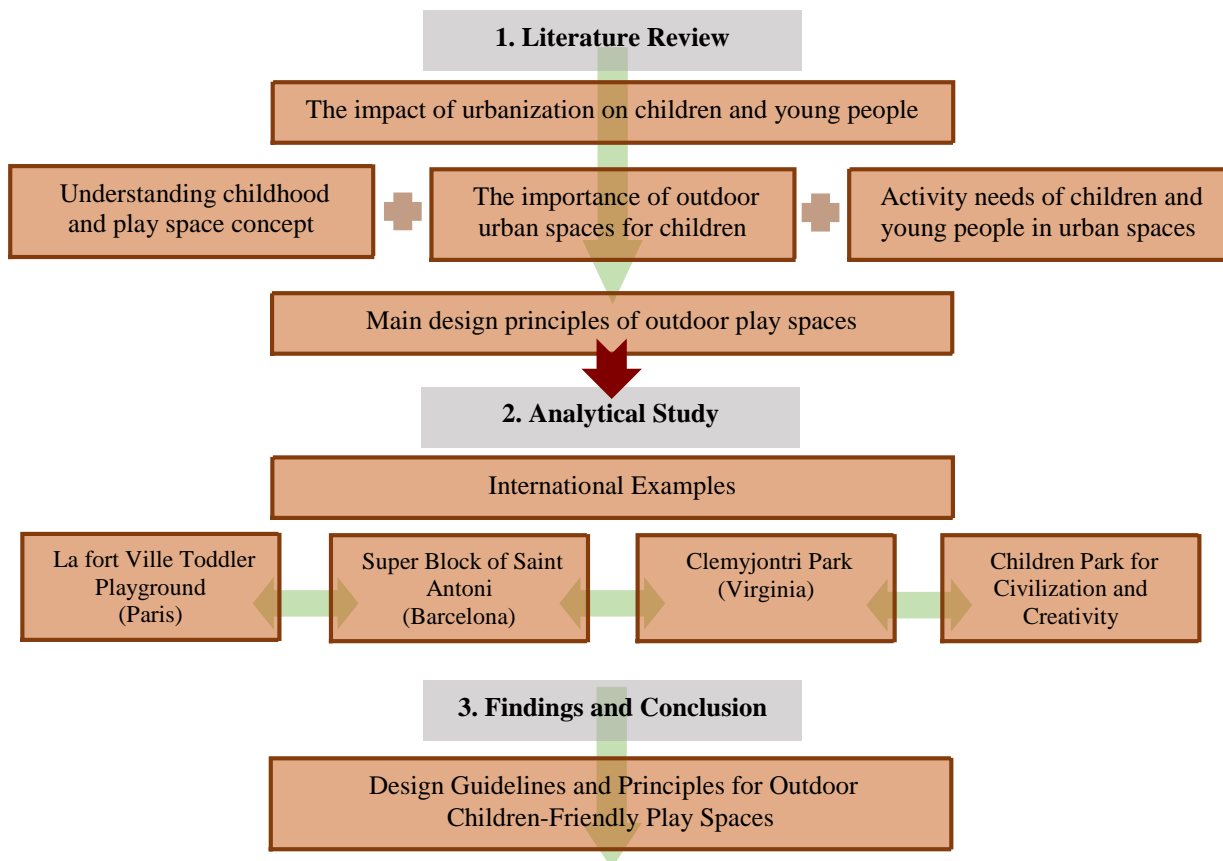


Figure 1. The methodology adopted in the study (By authors)

## Research Problem

### *The Impact of Urbanization on Children and Young People*

All around the world, most children are required to live in appropriated and controlled environments that are designed befittingly. These environments in which children live and interact are often the result of the work of planners and architects who are subjected to certain design guidelines (Gandah, 2017).

The challenge that children face on a daily basis, can be contributed to a variety of problems including the rapidly changing environment around them which is illustrated by the size of the traffic and pollution, the high-rise living urban sprawl and the newly constructed neighborhoods, the lack of access to outdoor open spaces, crime and social fears, ..... etc. (Wright, al., 2017).

Numerous earlier research has been conducted on children who live in cities that have experienced urbanization in countries and particularly the Eastern context, are gradually becoming aware of the adverse effects of rapid urbanization on children's physical and mental growth. Green areas and outdoor playgrounds for children have become more scarce due to high-rise and high-density urban development (Bao, al., 2021 and Shen, al., 2015). With the rapid development of urbanization, urban construction has improved quickly. However, the development of children's playground is relatively backward and they lack proper planning and funding which highlights the conflict between urban growth and children's needs. Children's play areas design tends to be instrumental and indoor due to their fundamental demands that are not easy to express. As children interact most closely, the physical activity status of outdoor play spaces has become an urgent topic (Jones, al., 2009).

## Literature Review

### *Understanding Childhood and Play Space Concept*

On one hand, this is addressed by posing a number of questions: who is considered as a child? What does the term "child" actually refer to (a youngster and adolescent or just a person without experience)? Cunningham (1995) argues that, the concept of childhood cannot be discussed in isolation from the community. Childhood is defined as: "*the period of time starting from childbirth and continue to childhood*". However, in case childhood is the only period mentioned, then it means that infancy is included as well. Childhood ends at the age of 18 (Gandah, 2017).

On the other hand, the term "play" has been defined in a variety of ways: Woolley and Lowe's (2013) research suggested that, the term "play" refers to a behavior in which actively participate by their free choice, personal direction and intrinsic motivation.

Play places can be applied to any area that children choose to play including playgrounds, private or public gardens, parks, street corners, football fields, pavements and open spaces of grass (Faragallah, 2018). These are just a few examples of places where children can play in the external outdoor environment without the supervision of their parents and to learn about the built and natural environment around them (Shi, 2017). Children-friendly spaces are generally green areas that contain areas for children games and sports activities, pedestrian paths and places to sit and its area does not exceed 200 square meters.

It is usually equipped with recreational uses and landscaping elements for entertainment. Wherever children live, they should have easy access to spaces and facilities where they can play freely and free of charge, coming and going as they please. The provision of designated play spaces is very important as well as access to and management of play spaces (Shackell, al., 2008).

### *The Importance of Outdoor Play Spaces for Children*

At both organizational and social levels, the childhood stage has become the main concern. Numerous studies around the world have been conducted over the years which have shown how crucial play is to children's development on both the individual and societal level. Outdoor play spaces have a significant impact on children's daily lives and the variety of their needs, particularly in urban areas (Woolley and Lowe, 2012).

Playing outside fulfils the basic childhood needs such as running, jumping, hiding, swinging, yelling, racing and climbing. These activities create a big mess for children and that is what childhood is all about. Playing outside helps children to do exercise which is beneficial for their physical development and mental health, gain fresh air and enjoy the natural environment. Through the process of seeking out physical and social activities together with social works, children could engage in social interaction with other people (Shen, al., 2015). In addition, benefits such as the intelligence development, emotional stability, imagination and creativity, self-confidence and individuality have been involved in the value system for children outdoor play (Woolley, 2008). However, the earlier studies have not linked the play value with the existing external space and the design factor on how to optimize these values in children's outdoor spaces.

Outdoor play spaces have direct impacts on children and young people. Researches reveal that children's physical environments have a significant impact on how they interact with others, develop as adults and experience life. The spaces that children and young people inhabit fundamentally impact their levels of fun and enjoyment of life. These areas have the ability to inspire their imagination and exploration and can also provide opportunities for connection with friends, family and community (Commission for Children and Young People, 2011). Outdoor play spaces are very important for children and young people to carry out different activities that are not possible in indoor settings. They consist of a set of physical elements that are coordinated by urban designers to achieve specific functions and goals that suit the nature of the users of urban spaces. Following this vision, outdoor play spaces provide a mix of uses within these spaces.

Children and young people require a space where they can socialize and spend time with others. An outdoor play space is different from a back garden or a school playground, as it is accessible to everyone in the community. The interactions that take place in public play spaces provide a rich education for children about the world around them and the people who live in it. In children-friendly outdoor play spaces, children of all ages are treated as healthy, active and participatory citizens and are free to play, explore and interact with others. In such spaces, parents can also feel comfortable because their children are free to walk outside without fear for them

being injured or their safety being jeopardized. This would happen if outdoor areas allowed individuals of all ages and backgrounds to participate and communicate through a range of activities and functions (Wright, al., 2017). Outdoor children's play areas contribute to their growth and development by enhancing their physical and mental well-being and enable them to develop a variety of skills through outdoor play (Madkour, al., 2023).

### **Activity Needs of Children and Young People in Outdoor Play Spaces**

Children's activities require different provisions based on their age groups. In early years, kids usually play to explore their senses, imagination and creativity. For children aged 3-5, opportunities that arouse their curiosity and support early development and skills are essential. As children enter school (between the ages of 6-12), their understanding of play concepts matures and they require more sophisticated activities that align with their growing abilities.

A large body of literature has investigated that physical activities established during childhood benefits children's longevity due to better lifestyle choices made during their early development (Wong, al., 2016). Thus, it is necessary to provide attractive elements for children in play spaces, so that they can enjoy their time, feel secure, and meet their needs. The needs of children and young people in outdoor play spaces are classified into psychological, social and functional needs as follows (Table 1).

#### **Functional Needs**

Functional needs involve creating an environment that encourages the formation of an ideal society and does not promote isolation or introversion. This is achieved through the availability of playing, sitting, exercising, walking, eating, drinking and interacting in children-friendly spaces. These spaces meet functional needs by providing an appropriate environment for children.

#### **Safety and security**

Outdoor play spaces must be designed with security and safety in mind. This includes providing fire extinguishing networks in case of fire, first aid boxes for injuries and using materials that are safe for children's movement. Avoiding rough edges and using non-slip materials for toys is crucial to prevent accidents. Safe spaces from dangerous factors are necessary for practicing multiple activities such as art, music and theoretical activities. When these spaces are secure and well-maintained, then they allow children to explore various interests safely.

#### **Flexibility**

The design of outdoor play spaces should be suitable for children, taking into account the flexibility of their movement while providing a calming atmosphere. Spaces should be adaptable to different activities, ensuring that children feel comfortable and reassured.

#### **Lighting and shading**

Natural lighting should be provided to the required extent, with shaded areas available during peak sun hours to

prevent vision problems. Adequate lighting during the night encourages children to play safely after dark.

#### **Climatic needs**

Providing safe spaces from climatic fluctuations, such as rain, wind, humidity and high temperature, is essential. These spaces should have a flexible design that suits children's needs, ensuring they can play comfortably regardless of weather conditions.

#### **Play needs**

Playing and moving are among the most important activities for children. Therefore, providing suitable outdoor play spaces for recreational activities is necessary, taking into account their flexible design and the sensitive nature and needs of a child.

#### **Psychological Needs**

Psychological needs are represented as a sense of strength, belonging and distinct personality. Children should be able to think and draw conclusions from the physical surroundings around them. This is achieved through the availability of exploration elements, the feeling for protection, love and acceptance, belonging as well as the demand to play.

#### **Family support**

Family support can be achieved through providing furniture that is comfortable and appropriate. This can be achieved through suitable seating areas, so that children can participate with their families in different activities (NSH, 2004). These areas create opportunities for family bonding and ensure that children feel supported and included in the urban environment.

#### **The need to feel intimacy**

The appropriate scale for children in terms of height and space must be taken into account to prevent negative feelings such as fear or dread. If the space or height exceeds what is comfortable for a child, it is preferable to use furniture or items of a larger scale to create a sense of balance and safety for the child.

#### **Self-reliance**

For children to acquire the skills of self-reliance and development of their personality, they need several non-slip elements and surfaces suitable for their movement to practice activities safely. This enables them to make decisions, share with others and experience various activities without the risk of harm.

#### **Understanding the surrounding environment**

Children need a space where they can perceive their individual vision. The use of colors as guides and understandable signs with easy ways to find things within the space helps children navigate and understand their environment and fosters a sense of independence and competence.

#### **Self-expression**

Encouraging children to express their needs is crucial for their psychological development. Outdoor play spaces should be designed to allow children to articulate their

thoughts and feelings freely, whether through playing, art or any other activities.

**The need for calm**

Children feel comfortable and active in quiet places away from noise. Providing spaces surrounded by greenery and plants can create a calming environment where children can relax and recharge, meeting their needs for tranquility.

**Social Needs**

Social demands are supported through the availability of various social activities. There are active social interactions such as team-playing games. The participatory approach involves space users in design and

implementation, ensuring the site’s flexibility for development according to users' needs (Koohsari, 2015).

**Sense of belonging and privacy**

When a child feels a sense of belonging in a space, privacy is achieved which helps children preserve their family bonds. In these areas children can feel secure and part of the community fosters their social development.

**Social interaction and communication**

Spaces should allow the formation of relationships and interaction with others. Providing group places for children to engage in many activities such as playing fosters social skills and a sense of community which is crucial for their development.

Table 1: The main activity needs for children and young people in outdoor play spaces and their design considerations (By authors)

Category	Needs	Description	Design Considerations
<b>Functional Needs</b>	Safety and security	Safe spaces for a variety of activities (artistic, musical, physical).	- Flexible and adaptable play areas. - Designated spaces for different activities.
	Flexibility	Child-friendly design that accommodates movement and exploration.	- Smooth, non-slip surfaces - Rounded edges to prevent injury. - Appropriate scale for children's use.
	Lighting and shading	Access to natural light with shaded areas for protection from harsh sun.	- Open spaces with natural light. - Shade structures for sun protection. - Night-time lighting for evening play.
	Climatic needs	Protection from weather elements (rain, wind, heat).	- Sheltered areas for bad weather. - Flexible design adaptable to different climates.
	Security	Safe environment free from hazards.	- Fire safety measures (extinguishers). - First-aid kit readily available. - Use of safe materials for play equipment. - Slip-resistant surfaces.
	Play needs	Opportunities for movement and physical activity.	- Open spaces for free play - Designated play areas with age appropriate equipment.
<b>Psychological Needs</b>	Sense of vitality, belonging and identity	Opportunities for exploration, discovery, and creativity. Feeling safe and secure.	- Discovery elements - Appropriate scale furniture and spaces. - Family-friendly activity areas - Colors and signage for wayfinding. - Quiet spaces with nature
	Family support	Feeling supported and connected to family.	Comfortable seating for families to participate in activities together.
	Sense of intimacy	Feeling comfortable and in control of their environment.	Spaces sized appropriately for children's scale.
	Self-reliance	Developing independence and decision-making skills.	Safe spaces with non-slip surfaces for movement and exploration.

	Understanding surroundings	Ability to navigate and understand the environment.	- Clear and easy-to-understand signage. - Use of color to guide wayfinding.
	Self-expression	Ability to express themselves creatively.	Materials and opportunities for creative play.
	Need for calm	Spaces for relaxation and quiet reflection.	- Green spaces with plants and trees. - Quiet areas away from noise.
<b>Social Needs</b>	Sense of belonging and	Feeling part of a community while having a space for individual needs.	- Defined group activity areas. - Spaces for quiet retreat.
	Social interaction and communication	Opportunities to build relationships and interact with others.	Spaces for group play and activities.
<b>Aesthetic Needs</b>	Senses	Opportunities to use senses (smell, touch, taste, hear, see)	- Different finishing materials and textures. - Use of fountains or water elements. - Use of attractive types of plants.
	Colors	The attraction of children’s attention.	Use of different bright colors.

**Design Principles for Children-Friendly Outdoor Play Spaces**

There are some aspects that are particularly important to children and young people. A child’s development is greatly influenced by the built environment, especially through its negative impacts on children’s health. In addition, there are moral and ethical responsibilities to provide children with appropriate settings. Understanding these design principles is an essential requirement.

**Safety**

Safety is an essential principle in outdoor play spaces and represent the biggest potential to the success of play spaces. Children want safe space to explore and take risks while minimizing the risk of injury. There are several factors that need to be considered for the safety of play spaces. These include the location of play area, the required safety regulations, ensuring that play equipments are age-appropriate, inclusion of safety flooring and planning for any deterioration that can cause health risks. Safety is paramount for children in outdoor play spaces. This extends beyond physical safety from hazards to encompass emotional and social well-being. Safe and well-maintained natural play areas allow children to manage these risks in a controlled setting, building confidence and resilience. By incorporating these safety considerations alongside the other design principles, children-friendly urban spaces can foster healthy development and well-being.

**Walkability**

The design principles discussed can contribute significantly to a safe environment for children. Encouraging children to walk and explore independently through walkable and accessible spaces fosters a sense of security and control. Clear, well-lit paths and amenities located within a short distance achieve this. Additionally, well-designed spaces that encourage social interaction among children and adults can create a sense of

community and belonging. This can deter crime and provide a network of watchful eyes over children at play.

**Accessibility**

Accessibility for an open play area refers to easy access and ensuring that the outdoor spaces are accessible to everyone, including those with disabilities. All outdoor play areas should with multiple entrances and exits. A natural flow within the open space can also help improve accessibility by allowing ease of movement throughout the space.

Outdoor play areas should be accessible places where children can gradually gain dependence and enjoy what the city offers them as they grow. Access to outdoor play areas may help children to stay healthy and avoid problems of obesity by providing opportunities for exercise and getting fresh air (CABE Space, 2004). Safe, accessible and inclusive spaces increase opportunities for play and interaction (Gehl, 2011).

**Comfort and Wellbeing**

The availability of facilities such as shared seating areas, public restrooms or changing areas encourage some users to access an outdoor play space. Therefore, such provision should therefore be carefully considered and incorporated into the overall design strategy.

**Connection to Nature**

According to the environmentalist David Orr, depriving children the right to explore the natural environment has a tremendous impact on children’s sense of place. He states that children’s sense of place is developed based on sensory experiences whereby they have direct contact with natural aspects of their environment (Orr, 1992).

The natural environment, being flexible and adaptable offers a canvas where children can face challenges, think critically and react to risk. The natural environment also provides the potential for outdoor applications of classroom learning. Spending time in green outdoor

settings also serves to reduce hyperactivity and increase focus on children.

Thus, connection to nature provides opportunities for exploration and challenge, but also carries inherent risks. The health benefits linked to access nature include benefits regarding cardiovascular, respiratory and digestive ailments as well as stress reduction, positive emotions and a boost in community (Batron, al., 2015). Children have also shown a preference for natural playgrounds where there is often a degree of risk attached, making these places more stimulating for play (Faber and Kuo, 2009).

### **Stimulation (engage all senses)**

Proper planning and design can contribute to the stimulation of children, enhancing their experience and consequently the relationship with certain places. Color, texture, sound and smell can all be harnessed by a designer to the benefit to those experiencing the place (Belfast Healthy Cities, 2021). Children-friendly play areas should feature various activities utilizing smell, sound, touch and sight. A sensory play space includes different equipments and areas that provide opportunities to stimulate each of the senses to encourage healthy exploration and learning.

### **Sociability and Independence**

Social interaction and responsibility are essential parts of a child's growth, integral to family life and the formation of friendships. Furthermore, a built environment can enable greater independence from adults. In order for children to thrive in a community, spaces and facilities that support and encourage social interaction are vital. Meaningful interactions with other members of the community, especially other children help to create a sense of community togetherness. It is therefore, important that outdoor play spaces promote and sustain social interaction and dependence. Seating, gathering spaces and lighting all have a specific role to play in this regard (Belfast Healthy Cities, 2021). The greater the variety in a play space, the more opportunities children have to develop and experiment the learning through play. It is important to include elements that stimulates minds and allow children to get creative.

### **Materials and Methods**

#### ***Applications for Children-Friendly Outdoor Paly Spaces***

In this section, four examples were selected where each case study is child-oriented and meets the criteria for designing outdoor children-friendly play spaces. Certainly, the requirements and needs of the children within the open space are carefully considered. Thus, the child will be satisfied with functional, aesthetic, psychological and social needs. The chosen outdoor play spaces in the examples are within the area and scale that are suitable and appropriate to children. As a result of this analysis, using the conducted criteria from the literature review, in terms of children's needs and the design guidelines adopted to fulfill their requirements and the nature of their urban formation. The analysis represents the design guidelines for the outdoor children-friendly play spaces that can be adopted to meet the requirements of children as users. Later, this will help to create sustainable communities suitable for children.

### **1) La Fort Ville Toddler Playground (Paris, France)**

A multi-purpose residual area between buildings which has been developed as a toddler's playground by the French urban planning and architecture firm Espace Libre. It covers 2,500 square meters and is located 7.6 kilometers from the heart of Paris's.

The playground is created to reuse the residual spaces and be a child-oriented space to engage and explore the surroundings through his senses. Additionally, it includes features that encourage discovery in which youngsters can improve their creativity and fine their motor abilities. The space has a free form, which illustrates its function, in addition to the use of color and variety in materials.

It is divided into three sections, a raised area for adults, a central space for children and a plot area. The site's topography is designed on several levels (distinctive stairs in red, slopes, voids, etc.). This is done using several color indication elements, such as red, yellowish-white, blue, yellow and green, as well as different textures including soft, medium and rough. Also, spaces are interconnected using softscape elements, such as trees, shrubs, groundcovers and climbers, ... etc. As a result, the latter will allow children to integrate and engage through a stimulating and appropriate environment.

The seating areas and their relationship with the outdoor space show simplicity in form and comfort in dealing with the landscape elements. Also, it allows parents to keep an eye and monitor their children easily. Furthermore, safety and recreational factors are realized through red rubber materials, since hot colors such as red indicate the slopes and ramps, inclinations and main walkways to attract the child's attention and ease of cognition to provide safety for them.

The design also facilitates playing in groups and interacting with the outdoor area. The ratio of green spaces and other activity zones is also balanced. The distinctive layout of spaces and the feeling of recreational character are achieved through the use of free forms. The proportions of the form of the garden are appropriate to the scale of the child. Also, visual cues for the elements of the landscape and the presence of green areas around the playing spaces provide a sense of recreation through the element of color, either through a green color, which refers to plants or through the walkway paths of movement and the simplicity of free form. Additionally, it provides visual correspondences between the elements of the landscape and its relationship with the child and the degree of his interaction with it, concerning the usage of hot colors (i.e. red) to attract the child's attention (Farouk, al., 2022).

There are areas for creative activities where children can draw through the help of landscape elements. The walkway texture changes to a black board to allow drawing and coloring activities. In order to provide recreational areas and group playing areas within the space. In this case study, there is an efficient use of materials and colors suitable for a child's cognition, and the form of space with clear edges and tangible scale. Besides, the flexibility factor of the site for the development and facilitation of redistributing activities and games was applied through participatory approach (Figure 2).

## 2) Superblock of Saint Antoni (Barcelona, Spain)

Previously there was an urban highway, now there is a healthy play space full of life and green. There were traffic intersections now there is a liveable plaza. Car noise has been replaced by children playing, cheerful conversations between neighbors or elderly people and challenging chess games (Figure 3). The area is still changing, but it is now adaptable and able to incorporate new changes derived from urban testing and social innovation. It occupies a surface area of more than 26,000 square meter of public space for citizens and youngsters. The real priority is for pedestrian, then comes bicycles and public transportation. It encourages social interaction and reuses the public space. The space makes use of natural elements, site furniture with the aim of gaining shared, green and safe spaces for users. This helps in reducing harmful environmental exposures as noise and air pollution and therefore it provides health benefits.

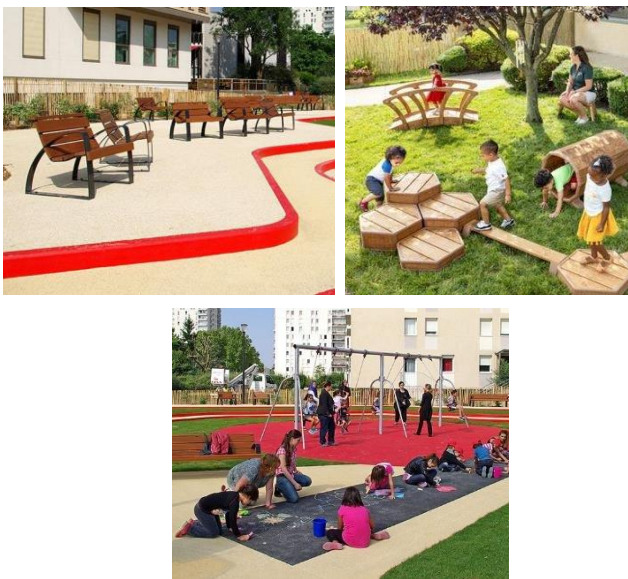


Figure 2. The main design features for La Forte Ville Toddler Playground (Farouk, al., 2022).

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This public space offers people safe and less polluted place to spend quality time. They started by limiting the car access to increase the green spaces. This is especially

for children, who can use the public space to play without worrying about traffic. These effects also help to prevent the chronic health problems. Therefore, these measures will have direct impact on the well-being of the citizens (Alshahed and Aly, 2022).



Figure 3. The transformation of Superblock into a children-friendly outdoor play space (Alshahed and Aly, 2022)

## 3) Clemyjontri Park (Virginia)

The design of Clemyjontri Park is large-scale, bright-colored and innovative. This outdoor space was created especially for children with developmental physical and sensory problems. It is a space where children can play together, regardless of their differences. In this play space, children who use wheelchairs, walking frames and other orthopaedic aids can have fun exploring and playing. In addition, it incorporates access features such as ramps, swings with high back supports, arm rests and other special safety features. The rubber flooring allows for wheelchair users to move around easily (Marqués-Ibáñez, 2016).

The barrier-free area is easy to reach and is designed to promote children's senses. There is a roundabout, a picnic pavilion, and an easy-to-access car park just a short distance from the playing area. Also, there is a wide variety of playing elements such as cubes, bricks, curved objects and cylinders. Children can fit these individual parts together in different ways to create dynamic and modifiable structures (Figure 4).



Figure 4. The bright-color design of Clemyjontri Park (Marqués-Ibáñez, 2016)

## 4) Children Park for Civilization and Creativity (Cairo, Egypt)

It is considered the first of its kind that serves as a public cultural source, designed mainly for children, for creative education, inventive work and interactive learning techniques. It is a non-formal learning space that is responsible for preserving the cultural heritage through transmission to future generations and raising awareness of its importance. The main entrance path leads to a large garden of about 58,800 square meters. It includes different types of plants and trees with labels indicating their names and species, allowing children to learn about nature while exploring. The garden has a representation of the Nile river (Fouad and Elsaid, 2021). It includes a theatre for concerts

and puppet shows, a cinema with 3D projection facilities, an educational library, outdoor classrooms for artistic and musical activities, a playground, a gift shop and a cafeteria. The main walkway leads to the museum which represents an integration of two colorful and vibrant models. Artwork, painting and ceramics are among the different activities and crafts that may be practiced in the garden. There are also social practices, rituals, festive events and traditional craftsmen ship (Figure 5).



Figure 5. The museum and other activities in Children Park for Civilization and Creativity (Fouad and Elsaid, 2021)

### Analysis of Examples

According to the literature review, the needs of children within the outdoor play spaces: physiological (i.e. sense of belonging to the space), functional (i.e. needs for the appropriate environment and activities), social (i.e. social activities and user participation) and aesthetical needs (i.e. hardscape and softscape are attractive to children) and identifying the requirements of each need separately. Also, the analysis of applications explained the adopted design solutions. This leads to conclude the main design guidelines and principles that can be used in outdoor play areas to be children-friendly to develop communities for children to live in.

### Findings and Discussions

This research highlights the critical impact of urbanization on children's health and development. Rapid urbanization has led to high traffic density, pollution and limited open spaces, creating unsafe and unhealthy environments for children and young people. These challenges underscore the necessity of designing outdoor play spaces that cater specifically to children's needs, providing safe areas for play and exploration.

The literature review examples reveal that children in densely populated urban areas often lack adequate facilities for recreation and learning, which can impede their physical and mental growth. Addressing these issues requires a multi-faceted approach, integrating safety, accessibility and inclusivity into urban design to create environments where children can thrive.

The examples presented in the study deal with the main needs of children in outdoor play spaces and its main design guidelines. Each example enriches understanding by providing a distinct perspective of recreation spaces. They also offer innovative proposals for current children's play spaces. Outdoor play spaces are sometimes located in leftover areas of cities that need to be used or located in city centers. These spaces provide an opportunity for

intergenerational interaction that promote communication between generations and the active sharing of experiences. The concept of children-friendly play spaces should be interactive, purposeful, interdisciplinary and aesthetically beautiful while offering a safe environment for the children that use it. This review identified 10 key design guidelines for children-friendly outdoor play spaces (Figure 6):

**Safety:** This ensures that spaces are physically safe from hazards and also considers emotional and social safety. Walkable and accessible spaces with clear sightlines, opportunities for social interaction and connections to nature can all contribute to a safe environment for children.

- **Accessibility:** Accessible spaces consider the needs of children with varying abilities to ensure everyone can participate in play and social interaction.
- **Walkability:** Children's ability to walk and explore their surroundings independently is fostered by safe, accessible spaces with amenities spaced no further than one kilometer apart.
- **Comfort and Well-being:** The availability of some supporting facilities in the outdoor play areas can greatly impact the ability of users with different needs to fully enjoy the play area.
- **Suitable Scale for Children's Psychological Needs:** This means designing spaces with furniture, equipment and features that are appropriately sized for children's bodies and considers their emotional well-being.
- **Connection to Nature:** Exposure to nature offers several benefits for children's physical and mental health. Natural spaces should be incorporated into urban design whenever possible.
- **Stimulation:** This means that thoughtful planning and design can significantly enrich the experiences of children through colors, textures, sounds, ... etc.
- **Bold Use of Rich Colors:** The strategic use of colors can add vibrancy to the space, improve children's wayfinding within an urban environment and enhance their aesthetic perception.
- **Sociability and independence:** Designers should think carefully about social function in play areas to create environments that foster interpersonal connections and a sense of belonging.
- **Diversity and Inclusion:** Children-friendly spaces should be welcoming and respectful of all children, regardless of background or culture.

Table 2: The different needs of children and the adopted design solutions in the examples (By authors)

Example	Needs	Adopted Design Guidelines Cognition	
<b>La Forte Ville Playground</b>	Functional	Safety	The use of red rubber materials and ease of cognition.
		Accessibility	Simple forms of walkways to attract the child's attention.
		Comfort	Seating areas with simple forms engaging with landscape elements.
	Psychological	Connection with nature	Softscape elements which include trees, shrubs, ground covers and climbers.
		Suitable for psychological needs	The design provides recreational areas to group playing.
	Aesthetical	Stimulation	The proportions of the form of the garden are appropriate to the scale of the child and the use of hot colors.
Social	Sociability and Independence	Creative activity fields are available.	
<b>Superblock of Saint Antoni</b>	Functional	Accessibility	The priority is for pedestrians, then comes bicycles and public transportation.
		Safety	Children use space to play without worrying about traffic.
	Psychological	Connection with nature	Use of natural elements and flexible landscape.
	Aesthetical	Stimulation	The use of signage and the color chart.
	Social	Sociability and Independence	Healthy outdoor play space full of life, children playing with cheerful conversations.
<b>Clemyjontri Park Fairfax Country</b>	Functional	Accessibility	The barrier-free zone allows for easy access and is designed to develop children's senses.
		Safety	The play area is specifically designed for children with physical, sensory and developmental disabilities.
	Psychological	Suitable for psychological needs	It has access for children with disabilities issues including ramps, swings with high back supports, arm rests and other. special safety
	Aesthetical	Stimulation	Clemyjontri Park boasts an innovative, large-scale and bright-colored design.
	Social	Sociability and Independence	This is a space where children can play together regardless of their differences.
		Diversity and Inclusion	There is a wide variety of elements: cubes, bricks, curved objects and cylinders.
<b>Children Park for Civilization and Creativity</b>	Functional	Accessibility	The main entrance path leads to a large garden.
		Walkability	All paths are primarily for pedestrians.
	Psychological	Suitable for psychological needs	The garden embraces a theatre for concerts and puppet shows, a cinema with 3D projection
	Aesthetical	Stimulation	The main entrance path to the museum represents an integration of two colorful and vibrant models.
	Social	Diversity and Inclusion	There are several social practices, rituals, festive events and traditional craftsmen ship.

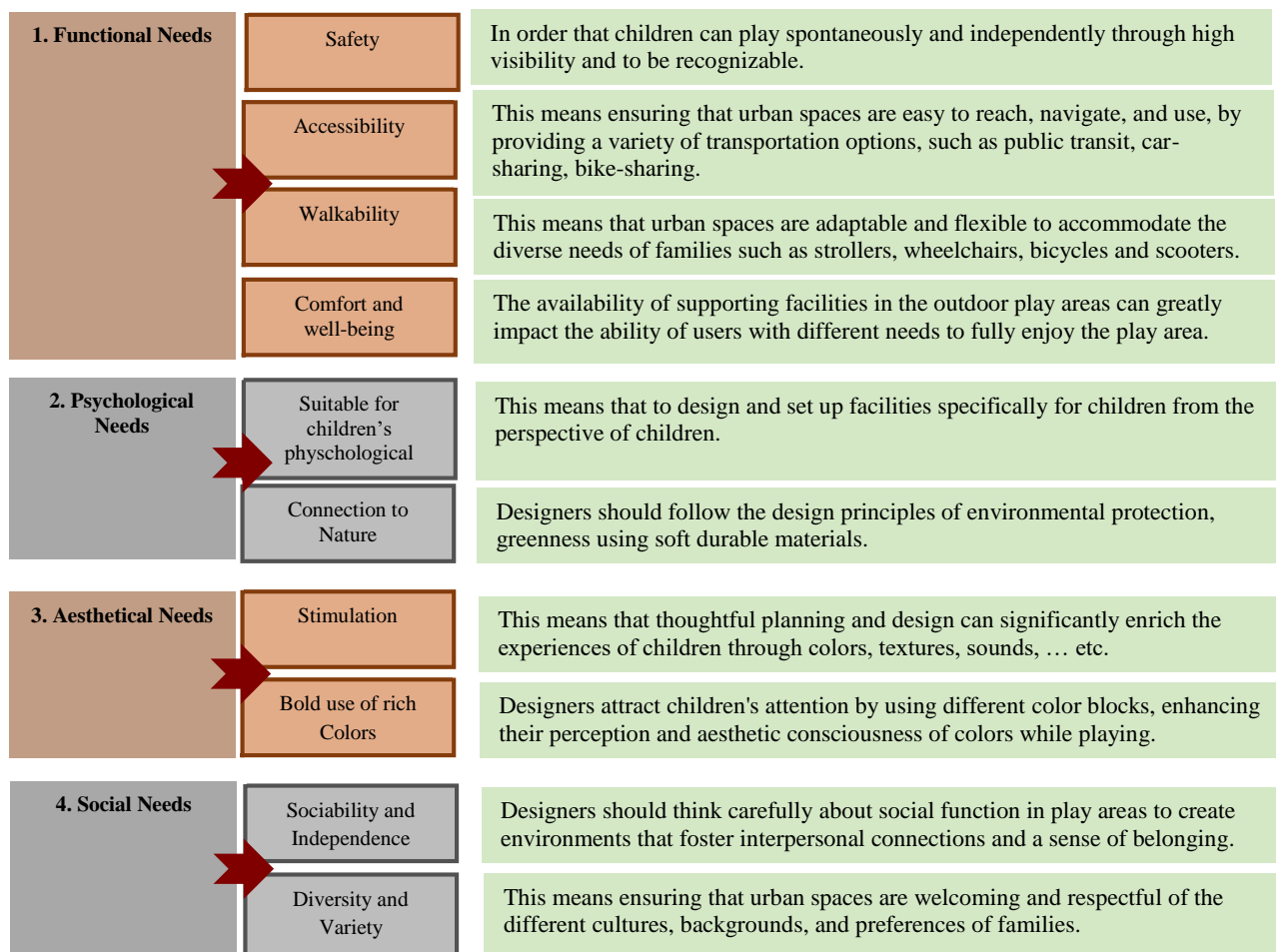


Figure 6. The concluded guidelines to design children-friendly outdoor play spaces (By Authors)

**Discussion**

These design guidelines can be used to create urban spaces that promote active and healthy lifestyles for children. Safe spaces that encourage exploration and social interaction can help counteract childhood obesity and social isolation. Exposure to nature has been shown to reduce stress and hyperactivity in children, improve cognitive function and promote creativity.

While this review focused on the importance of design principles, it is important to acknowledge that other factors such as access to healthcare, quality of education and social equity also play a significant role in child well-being. Overall, these findings advocate for a child-centric urban design philosophy that prioritizes the well-being and holistic development of young urban residents. By incorporating these findings, addressing the challenges of urbanization, and implementing the design principles outlined above, cities can be created that are not only functional but also nurturing environments where children can thrive.

The study emphasizes the importance of involving children and communities in the urban planning process. A participatory approach ensures that the spaces created reflect the actual needs and preferences of the users. By engaging children in the design and implementation stages. Urban planners can create more responsive and adaptive environments that promote social interaction, physical activity, and mental well-being. The study also points to the significant benefits of integrating green

spaces and natural elements into outdoor play areas, which not only enhance aesthetic appeal but also provide essential health benefits.

**Conclusion**

Rapid urbanization and high traffic density in modern cities have posed significant challenges for children's well-being, restricting their ability to enjoy a normal childhood. These challenges underscore the necessity of designing urban spaces that cater specifically to children's needs, providing safe areas for play and exploration. The research highlights that outdoor spaces are crucial for children's physical and mental development. These spaces foster exploration, social interaction and a sense of community. Children in densely populated urban areas often lack adequate facilities for recreation and learning, which can impede their growth. Addressing these issues requires a multi-faceted approach, integrating safety, accessibility, and inclusivity into urban design to create environments where children can thrive.

Consequently, the aim of this study is to develop an understanding of children's nature, needs in outdoor spaces and his/her influential role in building the society. It also aims to clarify how to create interactive outdoor environments that are oriented to children to fulfil their requirements.

This study investigated the design principles for creating safe, children-friendly responsive urban spaces. The research findings emphasize the importance of

prioritizing children's needs in urban planning to foster healthy development and well-being. Key findings from the study identified several design principles for child-friendly urban spaces. Safety encompasses physical safety from hazards, emotional security and opportunities for social interaction. Walkable and accessible spaces with clear sightlines and connections to nature contribute to a secure environment for children. Accessibility ensures that amenities are spaced no further than a kilometer apart, encouraging independent exploration by children and catering to users with varying abilities. Connection to nature offers numerous benefits for children's physical and mental health. The bold use of color enhances vibrancy, improves wayfinding for children and stimulates their aesthetic perception. Designing spaces with furniture, equipment and features appropriately sized for children's bodies and considering their emotional well-being is essential. Lastly, diversity and inclusion ensure that child-friendly spaces are welcoming and respectful of all children, regardless of background or culture. These design principles can be implemented to create urban spaces that promote healthy lifestyles and a sense of belonging for children and young people. By involving children and communities in the urban planning process, a participatory approach ensures that the spaces created

reflect the actual needs and preferences of their users, making them more responsive and adaptive.

Future research could explore adapting these principles to diverse contexts, considering factors like climate, budget and community needs. Additionally, it would be beneficial to investigate how to effectively measure the impact of these design principles on children's health, development and play behaviors. By prioritizing children-friendly design principles in urban planning, cities can be created that are not only functional but also nurturing for future generations.

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#### Conflict of Interest

The authors confirm that there is no conflict of interest with the publication of this article.

#### References

- Alshahed, S. and Aly, Sherine. (2022). Designing Public Open Spaces After the Pandemic: Towards a Healthy and Safe Environment. *FURP Conference: Contingency Planning of Adaptive Urbanism*. 20, 99-118. <https://doi.org/10.21608/furp2022.2022.1817>
- Bao, Y., Goa, M., Luo, D. and Zhou, X. (2021). Effects of Children Outdoor Physical Activity in the Urban Neighborhood Activity Space Environment. *Frontiers in Public Health*. 9. <https://doi.org/10.3389/fpubh.2021.631492>
- Batron, H., Thompson, S., Burgess, S. & Grant, M. (2015). *Routledge handbook of planning for health and wellbeing*. 1st ed. *Routledge*.
- Belfast Healthy Cities. (2021). *Designing Places for Children & Young People: Guidelines for Child-Centered Planning, Design and Stewardship for the Built Environment in Northern Ireland*.
- CABE Space (2004). *Involving young people in the design and care of urban spaces: What would you do with this space?*. CABE Education.
- Commission for Children and Young People (July 2011). *Building spaces and places for children and young people*. Western Australia
- Faragallah, R. (2018). The impact of productive open spaces on urban sustainability: The case of El Mensheya Square-Alexandria. *Alexandria Engineering Journal*, 57(4), 3969-3976. <https://doi.org/10.1016/j.aej.2018.02.008>
- Faber, A. & Kuo, F. (2009). Children with Attention Deficits Concentrate Better after Walk in the Park. *Journal of Attention Disorders*. 12(5), 402-409. <https://doi.org/10.1177/1087054708323000>
- Farouk, S., Refaat, M. and El Messeidy, R. (2022). Landscape Design as a Tool to Meet Children's Needs in Residual Urban Spaces. *Civil Engineering and Architecture*. 10(5A), 271-287. <https://doi.org/10.13189/cea.2022.101413>
- Fouad, R. and Elsaid, H. (2021). Promoting Children Tourism through Applying Virtual Reality to the Egyptian Child Museum. *International Journal of Heritage, Tourism and Hospitality*. 15(2), 1-19. <https://doi.org/10.21608/ijhth.2022.224770>
- Gandah, F. (2017). Children & Outdoor Urban Spaces Planning. *Arts and Design Studies*. 55, 27-32.
- Jones, AP., Coombes, EG., Griffin, SJ. & Van, S. (2009). Environmental Supportiveness for physical activity in English children: a study using global positioning systems. *International Journal of Behavior Nutrition and Physical Activity*. 6(42).
- Gehl, J. (2011). *Life between Buildings: Using Public Space*. Washington DC: Island Press.
- Koohsari, M.J. (2015). Public open space, physical activity, urban design and public health: concepts, methods and research agenda. 33, 75-82. <https://doi.org/10.1016/j.healthplace.2015.02.009>
- Krishnamurthy, S., Reijnders, C.S., & Stav, T. (2018). Child-Friendly Urban Design: Observations on Public Space from Eindhoven (NL) to Jerusalem (IL).
- Madkour, E., Afifi, E. & Khalil, S. (July 2023). A Proposed Model for Measuring the Performance of Urban Child's Activity Spaces. *Engineering Research Journal (Menoufia University)*. 46(3), 381-390. <https://doi.org/10.21608/erjm.2023.190878.1246>

- Marqués-Ibáñez, A. (2016). Development models for playgrounds in the contemporary urban fabric. *Training and Practice*. 14(1-2), 65-88. DOI: 10.17165/TP.2016.1-2.4
- Nations Children's Fund (UNICEF). (2013). The State of the World's Children 2012: Executive Summary.
- NSH. (2004). Friendly Health Care environment for Children and Young People. The Stationary Office, Department of Health. London.
- Orr, D. (1992). The problem of education. *New Directions for Higher Education*. 77, 3-8.
- Shackell, A., Butler, N., Doyle, P. and Ball, D. (2008). Design for Play: A guide to creating successful play spaces. DCSF Publications: Nottingham.
- Shen, M., XY, M. & He, L. (2015). Study on the development characteristics and redeveloping direction of children's playing space in high-rise housing estate. *Hum. Geography*. 30, 28-33.
- Shi, Y. (2017). Explore children's outdoor play spaces of community areas in high-density cities in China: Wuhan as an example. *Procedia Engineering*. 198, 654-682. <https://doi.org/10.1016/j.proeng.2017.07.118>
- Unicef (2012). Children in an Urban World. New York.
- United Nations, Department of Economic and Social Affairs, Population Division (2014).
- Wong, J., Parikh, P., Poh, B. & Deurenberg, P. (2016). Physical Activity of Malaysian Primary School Children. *Asia Pacific Journal of Public Health*. 28(5). <https://doi.org/10.1177/1010539516650726>
- Woolley, H. and Lowe, A. (2012). Exploring the Relationship between Design Approach and Play Value of Outdoor Play Spaces. *Landscape Research*. 38(1), 53-74. <https://doi.org/10.1080/01426397.2011.640432>
- Wright, H., Hargrave, J., Williams, S. & Zu, F. (2017). Cities Alive: Designing for Urban Childhoods. *ARUP Publications*.