

## ASSESSING CHILD-PLAY ENVIRONMENTS: ARCHITECTURAL IMPACT OF NATURE BASED PLAY-AREAS ON THE QUALITY OF CHILDREN'S DEVELOPMENT

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**Abstract.** This study is concerned with the positive impact of nature-based play on proper physical, social and cognitive child development. The study tackles the problem of conventional play areas in Cairo. Areas characterized by artificial environments and guided play, which limit children's ability to explore. The aim is to assess the conventional design approach of playgrounds and to reach recommendations for ones that acknowledge and incorporate the benefits of natural features in children's play spaces. The objectives of the study are to extract guidelines for the enhancement of the physical built environment based on the interaction of child driven play settings and to develop tools to incorporate child play spaces with natural elements.

The study adopts a methodology based on interviews and multi-tasked group workshops with children. A sample group of 25 children, aged six to eight years, were interviewed. They were also asked to draw their dream play spaces and to answer a visual questionnaire to record their impressions and suggestions towards play around natural features. The children were observed while playing in conventional playgrounds to record their interactions with the few available natural features. The fieldwork took place in three conventional play settings in Cairo.

The results of the study verify that children would choose natural elements to play around, if they were available. Moreover, the results advocate physical, social and cognitive potentials in the availability of natural features within play settings.

The study concludes that the conventional design approach of a soft ground with manufactured equipment needs to be revisited to accommodate natural features that offer free play opportunities. Thus, eventually prepare skilful, nature-conscious children.

**Keywords:** *Play and child development, playground design, nature and play, child participation in design.*

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### 1. Introduction

It is clearly noticeable that children today play in different forms and environments compared to the past; they are more fixed behind screens in virtual realities and in less contact with nature and reality (Alabay & Yagan Guder, 2018). A study conducted to compare favourite childhood play features of adults above 60 years old and those of children between six and ten years old showed that 85.86% of the adults loved playing outdoors when they were children while only 36.37% of the children showed the same

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interest in outdoor play. It has been detected that 34.34% of children would primarily prefer technology-related play (Alabay & Yagan Guder, 2018). Tovey (2007) advocates that there have become limited opportunities at present that children play outdoors, get dirty from involving with nature and experience sensory play. His study affirms that this has negative physical and psychological effects and does not compensate outdoor play regardless of digital benefits.

It is thus seen as the responsibility of designers, urban designers and childcare specialists to create play environments, which encourage children to get outside, be in contact with nature and engage in social as well as cognitive activities. Hence, a new design approach to providing spaces with endless play opportunities is hypothesized to help children develop their skills through first-hand experience with nature and real life.

Several international studies have investigated physical activity levels on natural playgrounds where it was found that participating children were more physically active. These studies support the use of natural playgrounds and green spaces to promote young children's development of basic motor skills. Few studies, however, have explored physical, social and cognitive developmental influences of nature play on Egyptian playgrounds, which is the focus of this study.

The spread of artificial environments and guided play in conventional play areas in Cairo, which limits child ability to explore, is the main problem. In addition to the limited play areas, which are mainly dominated by the private sector. This study thus focuses on young six to eight-year old schoolchildren and their environments- mainly outdoor playgrounds as the future users of cities. Thus, it is very important to train their senses and skills for a better quality future environment, through providing play environments, which enhance their creativity and knowledge skills simultaneously.

The historic 1989 United Nations' convention on the rights of the child has made a significant impact on the concepts of children's play and their right of participation, hence transformed children's lives across the world (UNICEF for every child, 1989). The convention has drawn researchers' attention to the importance of play, play areas, play quality and above all the concept of children participation. The main purpose of this study is to investigate the potential benefits of natural elements in developing Egyptian playgrounds. Based upon the case of playgrounds in Cairo, the majority of available playgrounds could be categorized as 'conventional'; therefore the study focuses on developmental benefits of the few available natural features on the studied play settings. This is achieved through listening to children's preferences in an interview and a visual questionnaire, as well as analysing their drawings and observing their behaviour around natural elements on three conventional play settings.

In order to achieve the research objectives, the structure focuses on finding answers for what developmental potentials of natural features on play settings are, how do children value natural features in their play settings and finally, whether the approach adopted in designing playgrounds in Cairo should be revisited.

As a theoretical background, this study will investigate the benefits of playing in nature for child development as well as the characteristics of conventional playgrounds compared to natural ones that have been mentioned by previous literature. The main objective is to provide guidelines for nature-based playgrounds especially in the context of Greater Cairo, to enhance the quality of future playground design, which is not widely researched in the before-mentioned context.

### ***1.1. Child development and nature-based play***

Play is defined as “*activities which children choose to undertake when not being told what to do by others*” (Beunderman *et al.*, 2007). Play is also non-goal directed, free of adult-imposed rules and is spontaneous (Memik, 2004). Hughes (2010) describes play as a pleasurable and non-literal activity that is performed only for the satisfaction of doing it and that it must be freely chosen by its participants.

Play builds healthy brains and bodies. *Physically*, it benefits children for burning off calories as well as a means for healthy physical movement (Casey, 2007). *Socially*, by enhancing playing in the form of co-operation, leading, following, building friendships, flexibility and self-awareness. Play simply makes the player happy; it minimizes anxiety, depression, aggression and sleep problems (Burdette & Whitaker, 2005). It encourages interacting with the world and teaches skills like conquering fears, confidence, sharing, negotiation and solving conflicts (Ginsburg, 2007). *Cognitively*, play develops decision-making skills such as planning, organizing, sequencing, independence, problem solving and creative thinking (Burdette & Whitaker, 2005). It encourages exploration and imagination, it stimulates all senses, pushes children to try things and take risks (Tovey, 2007).

Moreover, connecting children to nature has numerous positive effects on both their personal development and the future of the community (Charkas, 2022; Torkar & Rejc, 2017). Being ‘in nature’ is a start, yet, when children become more involved in nature, they progress to being ‘with nature’ and later to ‘for nature’ state. Involvement in nature is claimed to create a generation that values nature and acts accordingly as one of the sustainability-related advantages (Charkas, 2022). The results of the study by Mohamed, *et al.* (2022) demonstrate that children have real possibilities to develop and learn in nature. This study proved that children are more likely to be healthy and happy, more capable of creative thought and more likely to display cooperative helpful behaviours when they have a connection to nature. They recommend giving children the chance to play and work outdoors to foster pro-environmental attitudes, attachment to the natural world and self-assurance in their ability to work.

Unfortunately, the deprivation of play and interaction with natural environments and outer world may have possible consequences of nurturing violent and anti-social children (Beunderman *et al.*, 2007). Louv (2005) discussed the shocking gap between children and nature in his influential book on the ‘nature-deficit’ disorder and he directly links the absence of nature in the lives of today's wired generation to some of the most alarming childhood trends, including the rise in obesity, attention disorders and depression.

The reasons behind the shift away from nature are numerous; first are the swift technological inventions that are magical and addictive. Parent anxiety and high sense of security, which make adults more comfortable having their children in closed rooms rather than in open fields, is another reason (Ginsburg, 2007). Moreover, some urban factors like poor facilities, environmental quality issues and accessibility or proximity issues have affected the noticeable transition to indoor play (Dunnett *et al.*, 2002; Tovey, 2007; Beunderman *et al.*, 2007).

### ***1.2. Conventional vs. natural play settings***

The current design approach producing the majority of the playgrounds presented to children, named by Woolley and Lowe (2013) as KFC: Kit-Fence-Carpet is also known as ‘conventional’ playgrounds. They are playgrounds, which are usually fenced spaces

with risky, bulky fixed equipment (Frost, 1988) as shown in Figure 1. Conventional playgrounds are considered safe to an extent (Parsons, 2011; Hart & Sheehan, 1986), but uninspiring on the other hand; because children quickly master all gross motor skills that can be exercised by such equipment and find no challenge in them (Samsonky, 2007). Bowers (1988) is of view that play equipment that only allow one child to climb, slide or swing in a single, predetermined method severely restricts children's imaginative play. Cohen et al. (1978) claims that this typology of playgrounds could sometimes be boring due to lack of alternatives and does not integrate cognitive or social development. Whereas Memik (2004) mentioned that it develops 10% only of child development needs.



**Figure 1.** Conventional playground example:  
Tersana Sporting Club play area, Cairo.  
Photo taken by author, 2022

On the other hand, nature playgrounds as described by Torkar & Rejc (2017) are created in a forest patch for example, a playground in which predominant features are trees. The playground features numerous plants and fallen tree trunks. Richard Louv (2005) grew the trend in outdoor play areas called 'natural playgrounds' that incorporates natural features like trees, boulders, tree stumps and logs, greenery and gardens. A natural playground can also include a variety of play scenarios, by containing recycled items like tyres, ropes and other loose elements, such as sticks and rocks (Nicholson, 2009). According to Wike (2006) some experiences can only exist outdoors, like flowing water, moving clouds, animals, smells, feels and sounds, shouting and running.

Studies advocated natural environments as stimulants of more physical activity when compared to conventional playgrounds (Torkar & Rejc, 2017). Another study investigated the differences in sedentary behaviours and moderate-to-vigorous physical activity (MVPA) levels and playground utilization of young children before and after renovating a conventional playground to incorporate several natural elements. It suggested that the use of natural playgrounds might be a way to increase MVPA in children (Coe *et al.*, 2014).

According to Cohen et al. (1978), a playground ought to provide opportunities for running, throwing, jumping, climbing, pedalling, pushing and pulling, hitting and punching, kicking, crawling, somersaulting, rolling, balancing, swinging and sliding. Moreover, Hewes (2006) recommends offering opportunities for imaginative pretend play, building fortresses, experimenting with sand and water to enhance scientific and logical thinking, playing with objects and some rough play for social and emotional self-regulation. Direct dealing with nature is associated with the wealth of opportunity for developing cognitive skills like naming, sorting, intellectual processing, labelling, differentiating and classifying, as the child confronts a large stream of objects useful in developing and practicing these skills. Children's experience in nature stimulates a wide range of emotions from wonder, joy, challenge, fear, anxiety, pleasure, uncertainty and danger in addition to fantasy and imagination, which are all considered motivators for emotional development and learning (Kellert, 2002). Few environments other than nature could provide the child with as much opportunities (Torkar & Rejc, 2017).

Table 1 is constructed to collect and summarize most forms of natural features connected with their qualities mentioned in previous studies (Davis *et al.*, 2009; Cohen *et al.*, 1978; Shackell *et al.*, 2004; Endenburg & van Lith, 2011; Exley & Exley, 2007).

**Table 1.** Forms of natural features and their play qualities

<b>Element</b>	<b>Form</b>	<b>Quality</b>
<b>Water</b>	<ul style="list-style-type: none"> <li>▪ Standing: Puddles- Pools</li> <li>▪ Constantly Flowing</li> <li>▪ Flowing by manual Pumps</li> </ul> (Davis, White, & Knight, 2009)	<ul style="list-style-type: none"> <li>▪ Very attractive for children</li> <li>▪ Could be enjoyed by adults and children.</li> <li>▪ Could be related to other sorts of play like sand and water colouring</li> </ul> (Cohen <i>et al.</i> , 1978) <ul style="list-style-type: none"> <li>▪ Cooperative play with water</li> </ul> (Shackell <i>et al.</i> , 2004)
<b>Sand</b>	<ul style="list-style-type: none"> <li>▪ Sand pits</li> <li>▪ Surrounding water features</li> </ul> (Cohen <i>et al.</i> , 1978)	<ul style="list-style-type: none"> <li>▪ Opportunity and surface for creative play</li> </ul> (Shackell <i>et al.</i> , 2004) <ul style="list-style-type: none"> <li>▪ Easy to manipulate</li> <li>▪ Encourages cooperative play</li> </ul> (Cohen <i>et al.</i> , 1978)
<b>Trees</b>	<ul style="list-style-type: none"> <li>▪ Different sizes and colours</li> <li>▪ Different locations in the play space:               <ul style="list-style-type: none"> <li>- Central Landmark</li> <li>- Space definer at the edges.</li> </ul> </li> </ul> (Cohen <i>et al.</i> , 1978)	<ul style="list-style-type: none"> <li>▪ Opportunity for swinging and climbing</li> <li>▪ Definition of Space</li> <li>▪ Shaded areas</li> <li>▪ Private locations</li> <li>▪ Loose parts for play</li> <li>▪ Encourage fantasy play</li> <li>▪ Science Projects</li> <li>▪ Landmark</li> <li>▪ Edible fruits</li> </ul> (Cohen <i>et al.</i> , 1978)
<b>Vegetation</b>	<ul style="list-style-type: none"> <li>▪ Grass</li> <li>▪ Bushes</li> <li>▪ Planting areas</li> </ul> (Cohen <i>et al.</i> , 1978)	<ul style="list-style-type: none"> <li>▪ Learning environment</li> <li>▪ Planting</li> <li>▪ Attracting birds and butterflies</li> <li>▪ Learning about colours and textures</li> </ul> (Davis <i>et al.</i> , 2009)
<b>Hardscape</b>	<ul style="list-style-type: none"> <li>▪ Stones and rocks</li> <li>▪ Logs</li> <li>▪ Tree trunks</li> </ul> (Davis <i>et al.</i> , 2009)	<ul style="list-style-type: none"> <li>▪ Setting for creative play</li> <li>▪ Places to sit &amp; hangout</li> <li>▪ Feel different textures</li> </ul> (Davis <i>et al.</i> , 2009) <ul style="list-style-type: none"> <li>▪ Creating territories</li> <li>▪ Fantasy Play</li> <li>▪ Landmark</li> <li>▪ Learning Classifications</li> <li>▪ Encourage climbing and sliding</li> </ul> (Cohen <i>et al.</i> , 1978).
<b>Animals</b>	<ul style="list-style-type: none"> <li>▪ Farming setting</li> <li>▪ Feeding animals</li> <li>▪ Petting animals</li> <li>▪ Riding horses/ donkeys</li> </ul> (Cohen <i>et al.</i> , 1978)	<ul style="list-style-type: none"> <li>▪ Social- emotional development.</li> <li>▪ Cognitive development</li> </ul> (Cohen <i>et al.</i> , 1978). <ul style="list-style-type: none"> <li>▪ Therapeutic Interventions</li> </ul> (Endenburg & van Lith, 2011)

<b>Sun and Wind</b>	<ul style="list-style-type: none"> <li>▪ Weather stations. (Exley &amp; Exley, 2007)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Listening to wind blow and learning sounds.</li> <li>▪ Learning sun &amp; shade.</li> <li>▪ Learning about seasons</li> <li>▪ Learning about senses and feelings: cold vs. hot</li> </ul> <p>(Shackell <i>et al.</i>, 2004).</p>
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**Figure 2.** Children playing in nature, Monzoo Cairo. Photo taken by author, 2022



**Figure 3.** Children playing in nature, Fagnoon Cairo. Photo taken by author, 2014

In the Egyptian context, few ‘natural playgrounds’ as defined by researchers could be found. Rather, spaces available with rich natural elements in Cairo are a clear farm typology and cannot be defined as a natural playground, such as Agwani farm, Kidzoo, Monzoo and others, examples shown in Figure 2. However, in recent years the concept of including nature in play settings has been applied to some play settings. Fagnoon play area in Cairo shown in Figure 3 is one valuable example where children get in contact with natural materials, mud, plants, woods and others. In addition, natural elements are represented in the vast agricultural land included on the site of Fagnoon and in the animals with which children get into direct contact: feeding goats, riding donkeys, horses and camels. Also included are mud, colour and water fights, which are provided for older children and teenagers.

The previous section could be summarized in indicating the problematic nature of digitalized children’s play today and their lack of opportunities to interact with nature. Despite the proven positive impacts of outdoor play especially nature-based on children’s development, the majority of playgrounds in Cairo are conventional. However, the question still lies, do children themselves value natural features in their play settings and how do they behave around available nature elements. These questions will be investigated with children on play settings to answer the main inquiry about the value of conventional playground design on children’s development.

## 2. Research Design

This section will describe the methods applied in order to collect the data, analyse it and draw results. The approach of ‘listening to children’ will be explained, the research design, methods, location selection and sample will be detailed.

### 2.1. Listening to children

Listening to children is adopted as the method of this study, as we are trying to reveal what children think and enable them to participate in forming their own physical

world. Involving children in the different stages of the design process has proved to have many benefits: from innovative ideas, to start with, to building a sense of ownership and belonging to the place, as well as teaching them to express their opinion while respecting others', which again builds their character and confidence. Designers then translate an imaginative idea into a physical form, with colours and materials that can be freely enjoyed by the child (Laris, 2005).

The research has used some traditional methods such as interviews and questionnaires and some art-based activities like drawings (Clark & Moss, 2005). In general, using task-based methods is more interesting to children and reduces potential pressure of an uncomfortable interview (Punch, 2002). Taking into consideration the parents' and the child's consent for participation and issues of children's anonymity (Morrow, 2008).

The data-collecting approach of this research to provide answers to the research questions was based on a specially- designed multi- task method. Clark & Moss (2005) confirm that triangulation of methods is necessary when collecting data from children, meaning that several methods are used on several groups of people in several locations and piecing the information together to create the nearest possible image to reality- also defined by Alison Clark as The Mosaic Method. This method is considered most appropriate for research with children for two reasons, firstly because using interesting methods and tasks encourages children to participate. Secondly, using several methods together helps the researcher create an appropriate image due to reliability issues and excludes the possibility of biased information.

## ***2.2. Methods***

This study used interviews with children, children drawing activity and a visual questionnaire, to investigate children's views concerning the natural features in their play settings. In addition, observations of the children's behaviour on the play settings, especially around nature took place. A written consent to participate was obtained from all participants' parent or legal guardian, after verbally explaining the scope of research, anonymity state and the right to withdraw at any stage, as well as presenting a printed leaflet containing this information. No images or questions were directed to children before receiving verbal/ written consent.

### ***Interviews***

Children were interviewed by the researchers in the play setting during play to give them a sense of normality and remove any uncomfortable feelings; they were first introduced to the researchers in the presence of their parents and then asked if they wanted to join. The interview used semi-structured, open-end questions to investigate children's ideas and preferences. The questions asked to children were:

- Do you like to play outdoors? Why?
- Do you think playing outside has helped you?
- What are your favourite objects/places?
- Do you play with natural elements? How and which?

### ***Children's drawings***

This method was applied to collect data from children by asking them to draw their 'dream play area', providing them with white sheets of paper and felt-tip colours to use in the play setting. They were given the needed time to finish their drawings and afterwards, the children were asked to explain to the researchers what each element in

their drawing represented and how it was going to be used. These drawings were then analysed to investigate children's preferences of the current situation and their ideas for a better play area.

#### *Visual questionnaire*

The questionnaire was designed in a visual format, due to the difficulties that would face children to read and fill a written questionnaire form. Nine A5 sized photographs of natural features were shown to each child and the researchers asked them what he/she thinks about this certain feature.



**Figure 4.** Examples of the images shown to children for the visual questionnaire. All retrieved from: <https://images.google.com/>

Specifically, the children were instructed to look at the items and put a tick in one of the corresponding columns (I love/ I hate) if the item already exists and (I wish for/ I would not prefer) if it was not already available in the play area. The children were reminded that there was no right and wrong answers. Pictures were shown to the children one by one to avoid being distracted if they saw several pictures at the same time. The researchers also took notes of some additional comments by the children towards the features. The elements shown to the children in the visual questionnaire were trees, grass, mud, sand, water, rocks, wood, animals and planting.

#### *Observations*

The authors observed children during play, sketched diagrams of their play behaviour and recorded quotations from their conversations to describe their choices of play with natural features and to observe the skills practised while playing. To indicate the developmental skills, some indicative behaviours were observed such as running, climbing, jumping, taking big steps, handling fine objects for physical skills. Solitary play versus group play, sense of pride in accomplishments and independence were regarded as indicators for social skills, while problem solving, imagination, creativity, experimenting and classification were used for cognitive skills. The researchers put clear definitions of distinctive behaviours prior to observation sessions to decide whether behaviour represents the target skill observed.



The researchers created a matrix identifying the behaviours observed, the setting where each behaviour took place and a space for notes. The matrix was used in the observation sessions. The researchers depended on a non-participant direct observations methodology, where groups of children were observed for 30-minute intervals in each of the three settings, on a 1-minute sampling method on two occasions: a weekday and a weekend. The observer noted the occurrence of the mentioned behaviours and the play feature where this behaviour took place. Along with the written notes, sketches and quotations; pictures, videos and sketches were also used to document these observations after systematically observing children's free play in the three settings.

### ***2.3. Sample***

The sample studied in this research were early school-aged children, six to eight years of age. An average of seven children in each visited site participated in the interview, questionnaire and drawings in the form of workshops in the three sites. Thus, a total between 15 and 25 responds to each method were received. The observation sessions however, took place prior to the workshop event to prevent influencing the children's behaviour after noticing the presence of the researcher.

The observation sessions included groups of children present on the play areas at the time of the sessions. The total number of children playing at the time of the observation session in the first setting (Shooting Club), was 25 children on the weekday. However, on the weekend, the number of users was 80 children. In the second setting (Cairo Sporting Club) only six children, were present in the play setting on the weekday and 15 children on the weekend. In the third setting (Al-Azhar Park), approximately 45 children were playing on the weekday and 70 on the weekend.

The children included in the sample for the interviews, questionnaires and drawings participated according to a snowball sampling method in each site. One random child within the chosen age group would be approached by the researcher and then others joined in. All methods were applied to each child individually to prevent the influence of one child's opinion on others, except for drawings where some children chose to sit in groups.

### ***2.4. Location selection***

The authors surveyed 90 play provisions around Greater Cairo and categorized them by typology, in order to select the locations for performing the workshops with children. The survey showed that the majority of available outdoor play areas are consecutively: play areas inside social clubs (32%), play areas attached to restaurants and adult facilities (27%) and play areas inside public parks (19%). Other options for play were inside zoo and farm locations, adventure playgrounds, separate play spots, amusement parks, cultural areas and other special themes.

As indicated, 28 out of the 90 locations are play areas inside social and sporting clubs in Greater Cairo. These clubs require a membership and are not open for the public. Play areas attached to restaurants or facilities are open for public use but are not designed primarily for children, thus were excluded from the site selection process. Play areas inside public parks matched the selection criteria better.

Accordingly, three sites were selected for the workshops. Two were chosen from the social clubs typology: Shooting Club in Dokki and Cairo Sporting Club in Giza. The third location was from the public parks typology, which is the play area inside Al-Azhar Park. Therefore, the sample of settings covers a variety between public and private settings serving middle class users, all as a play area designed specifically for children as

a prime user. The three chosen play settings are ‘conventional playgrounds’, as the survey showed a scarcity of ‘natural playgrounds’ according to the definitions mentioned in literature.



**Figure 5.** Shooting Club play area.  
Photo taken by author.



**Figure 6.** Cairo Sporting Club play area. Photo taken by author



**Figure 7.** Al-Azhar Park play area. Photo taken by author

Children's play area in Shooting Club, Dokki is part of a club that was first constructed in 1953, and then an extension was built in 1975. The whole site area is approximately 9000 m<sup>2</sup> from which only 1170 m<sup>2</sup> are playing spots for children, 3500 m<sup>2</sup> are unused and non-accessible green areas, and the rest used for circulation paths and seating areas. The site is a traditional private play area.

Children's play area in Cairo Sporting Club, Giza's whole site area is approximately 1000 m<sup>2</sup>; parents' seating areas are outside this area. The site is a traditional private play area.

Children's play area in Al-Azhar Park, which was founded in 2005; created by the Historic Cities Support Programme of the Aga Khan Trust for Culture. It is considered Cairo's lung as it is a large green space in the heart of Cairo. It has many activities and vast green areas. One of the zones at the edge of the park was designed to be a children's play area. The playground area is approximately 5000 m<sup>2</sup>. The site is a traditional play area open for the public by tickets.

#### ***Characteristics of the studied settings***

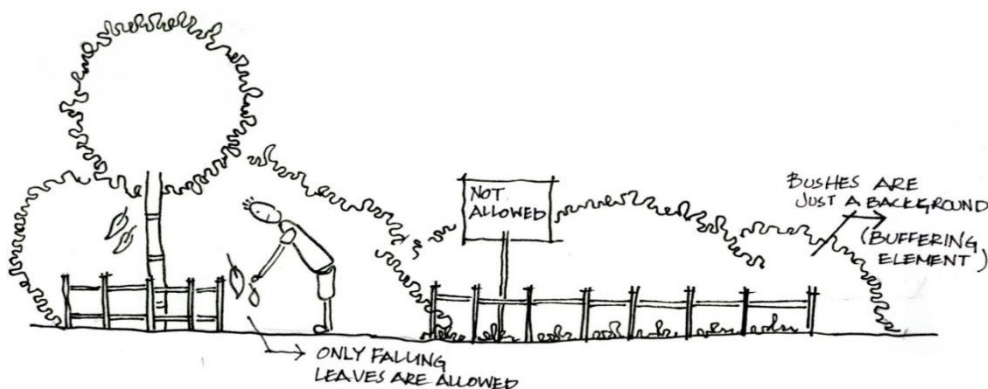
In the three settings included in the study there were some common notes found concerning the current state of natural elements. The elements available in the play areas were vegetation -mainly grass, shrubs and trees for decorative functions- and sand. No stones, animals, mud, wood or water features were available for children's play. In

Shooting Club and Cairo Sporting Club, children were not allowed to play on grass and green areas were fenced. The two play areas had some trees, mostly fenced; in addition, their branches were not encouraging for climbing. There were some flower boxes in several parts of the two play areas, which were fenced and not allowed for children to play with as illustrated in figure 11. In Al-Azhar Park play area, children’s interaction with natural features was allowed. The trees were all unfenced and they were allowed to run and play on grassy grounds. The three play settings had sandy grounds underneath the swings and slides and children were allowed to play on and with sand.

The following table summarizes the characteristics of the included play settings regarding surroundings, materials, play elements and natural features.

**Table 2.** Characteristics of play settings studied

Characteristics	Shooting Club	Cairo Sporting Club	Al-Azhar Park
Fixed Equipment	Yes	Yes	Yes
Fenced	No	Yes	Yes
Metal/ Wood Play structures	Yes	Yes	Yes
Soft Flooring (sand/rubber)	Yes	Yes	Yes
Physical Play (climbing structures/ places to run)	Yes	Yes	Yes
Loose Parts	No	No	No
Play Leaders	No	No	No
Playing with Natural Elements allowed	No	No	Yes
Arts and Crafts	No	No	No
Dramatic Play	No	No	No
Building Games	No	No	No



**Figure 8.** Play with natural elements in studied playgrounds. Sketch by author

### 3. Results

Results were derived from children's answers to interviews, to the questionnaires and from the children's drawings, in addition to the researcher's observations. Children's answers to the interviews and the questionnaire were organized by theme according to their content, giving them keywords related to the natural features discussed. The analysis of drawings observed meanings behind children's drawings, depending on the size of objects drawn, their order in the drawing, their location on the sheet of paper, their repetition and the choice of colours. The observation process documented children's relations with natural features associated with physical, social and cognitive skills.

#### 3.1. Results of children's interviews

In total, 15 children agreed to participate in interviews, including one child who agreed only on the condition that the researcher would play a game with him first. The answers to the interview questions are summarized in Figure 12.

When children were asked if they like to play outdoors in preference to playing indoors, 14 out of 15 children said they liked to play outdoors, some giving certain reasons for this and others not. Amongst the reasons mentioned by children were that playing outdoors is more fun, or because of the weather, sun and fresh air, or because they can run and play games. In other words, open areas are a wide space where they can perform many games and activities. Children used words like 'run', 'hide & seek', 'wide', 'nice weather', 'ball', 'scooter', 'light', 'trees' and 'fun'.

When children were asked if they benefited from playing in an outdoor environment, their responses showed that they did not directly feel they were learning something while playing. This question was one that many of the sample children could not answer, as they could not relate directly to the benefit they got from playing; they just saw playing as an amusement. The benefits mentioned by some of the children varied between physical ones like being more active and able to exercise advanced activities, or learning to keep their balance as well as some social benefits in making new friends.

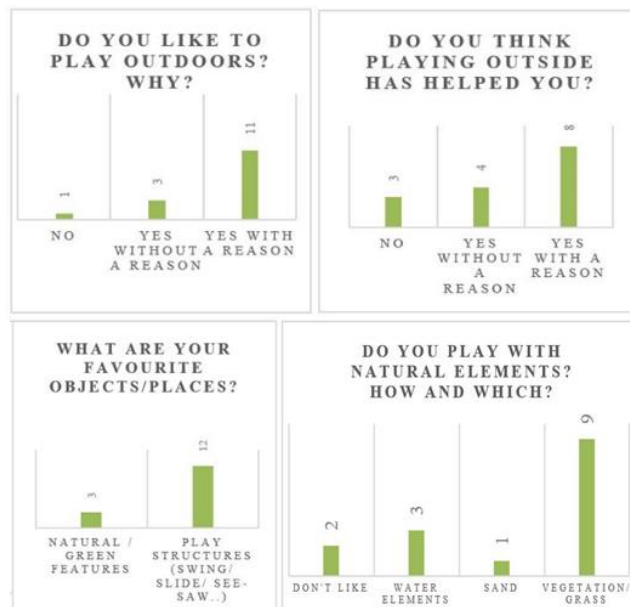


Figure 9. Children's responses to interview questions

Being asked about their favourite object or corner in the play area 12 out of 15 children interviewed mentioned a certain play structure or designated object to be their favourite spot on the play area, whether a swing, slide, see-saw or climbing beam. Only three children mentioned natural or green elements as a favourite; in general, they did not acknowledge natural elements as play elements.

When asked if they play with vegetation; trees, plants, flowers and grass were the most popular elements in interviews with children- more than sand and water. Children said they felt that playing with trees or plants would cause damage and it is only better to play with the fallen leaves doing art activities or pretend play. Some children mentioned watering plants, smelling flowers and other activities like climbing trees and running on grass as a preference. Only two of the children interviewed said they did not like natural elements and the reason behind that was that it was messy. Four children mentioned words like ‘messy’ and ‘dirty’ related to their play with natural features.

### 3.2. Results of children’s drawing activity

This activity was the best received amongst participants as 25 children agreed to participate in the drawing activity. This activity took place before the visual questionnaire images were shown to children, in order to avoid any influence after seeing the images. Children sat in groups or alone somewhere in their play area and were asked to draw their ‘dream play area’ or play feature. Previous research had suggested that drawings need secondary aiding methods such as discussion with the child around the topic of the drawing or written text (Bland, 2012). Therefore, the researcher had a quick conversation with each child after finishing his/her drawing. The children would explain the meaning of their drawn feature and sometimes tell the story behind it. This was helpful to code and classify drawings for analysis later.



**Figure 10.** Animals in children’s drawings

The researchers identified the drawings’ contents and most emphasized features and gave those keywords to organize drawings. Three main themes emerged accordingly: natural elements, non-natural elements and human elements.

As a first impression, it was apparent in the majority of the drawings that the children visualized an outdoor play space and not an indoor one, as their dream play area. One or more natural feature such as the sun, sky, birds, animals, greens, trees, sand and water appeared in 19 of the total 25 drawings. However, only four of those 19 drawings

considered nature as an opportunity for play rather than just a setting or background. The same indication was found in children's drawings featuring non-natural play, where in 13 out of 25 drawings a form of play structure showed as the main play element, with natural elements as a background setting rather than a play object.

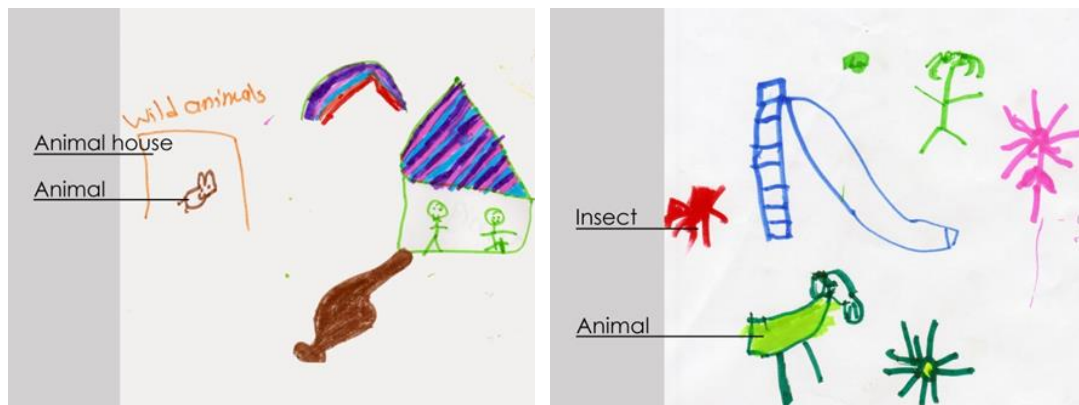
**Table 3.** Features appearing in children's drawings, grouped by researcher

Natural Elements	Non- natural elements	Human elements
Water Features	Play Structures	Children Playing
Animals	Elevated play objects	Parents supervising
Sun/ Sky/ clouds	Loose play parts (balls/ toys)	
Trees	Cave	
Grass	Maze	
Sand	Imaginary play equipment	
Flowers/ plants	(suggested by children)	

Animals -as a special feature of nature- appeared several times in children's drawings. Children seemed to interpret animals as a play companion. In the drawing on the left, the child drew a house for humans and an adjacent house for the animal, explaining that they can exist and play together. In the drawing on the right, the child drew three different forms of animals and insects, a girl and a boy all surrounding the slide; explaining that they can all play together and use the slide.

### 3.3. Results of children's visual questionnaire

The visual questionnaire was answered by 23 children. They were asked to respond to each image shown to them. Results were summed up where 'I love' and 'I wish for' were considered positive responses while 'I hate' and 'I wouldn't prefer' as negative responses, in Figure 11.



**Figure 11.** Natural features in children's drawings

Some elements shown to children were very popular receiving a majority of positive reactions, such as animals, playing on grass, planting and water features. Other features were less favoured such as sand, wood, trees, mud and rocks.

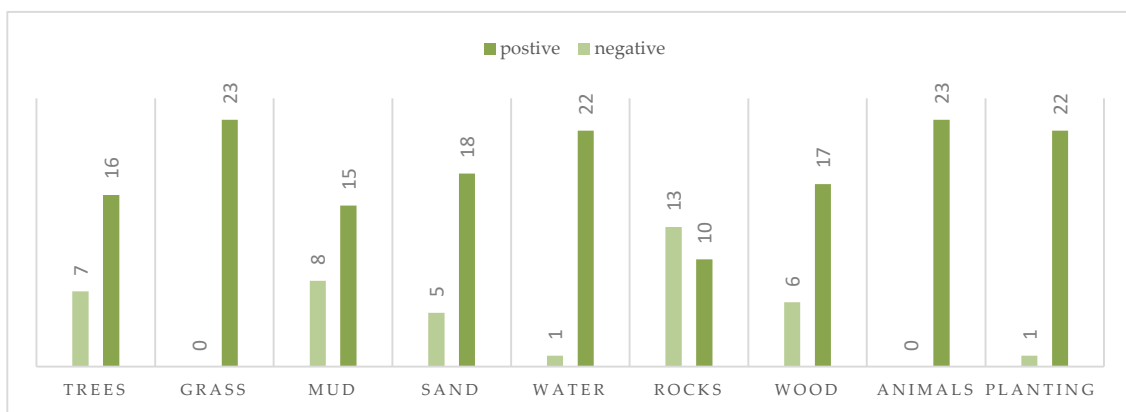
Animals were a very popular option for children; all questionnaire answers showed extreme excitement towards playing with animals, especially barn animals. The only concern was the cleanliness of the animal as a condition for playing with it. Similarly, all

participating children had positive responses towards playing on grass, for various reasons. It was noticed from their comments on playing with green parts in general, especially on grass, that they realized how plants grow by time and that they should take care of plants instead of cutting them. Planting was a very popular activity where 22 out of 23 children had a positive response towards it but again hygiene and parent approval to get into dirty activities were the concerns. The children's responses to water play were similar; they were generally excited to play in and with water, however concerned if their parents would approve of such games because their clothes would get wet.

Children's responses to sand play in the questionnaire, however, were variable where 18 out of 23 had positive responses to playing with sand although they thought it was messy. Others said they would only play with sand if it was clean and did not contain dirty particles and if it was in a limited fenced area not covering the whole ground. The researcher got *"mum doesn't allow me"* as a very common comment when asked about sand play. Children said they like to play in sand with toys that they had brought from home. These responses resembled their responses to playing with natural tree trunks or similar features shown in the images, where 17 out of 23 children gave positive responses to playing with wooden elements and 16 children to playing with or above trees.

Children, moreover, had some specifications for the trees they liked; some preferred big trunks, while others favoured short trees and some others liked bright clean leaves. All the negative responds mentioned safety issues, like being hurt, scratched or falling down.

On the other hand, most questionnaire answers said they would not play in mud, because they were afraid to get dirty; however, a child suggested 'play dough' as a cleaner material that they can play with like mud. The percentage of children who had negative responses towards mud quoted *"mum and dad would say no"*. Therefore, again their response was because of parents' objection not because the children themselves did not like it. Children had mixed feelings towards playing on rocks, as they were both afraid and interested so we received answers of questionnaire like "I could get hurt or hurt others "as well as" we can have a soft surface or a trampoline below it, so if we fall we don't get hurt



**Figure 12.** Children's responses to visual questionnaire

### 3.4. Results of observations sessions

In addition to all the previous methods mentioned, the researchers performed observations of children's play attitudes in the three play areas and their behaviour around different features as a reliable method to draw results. The observation process documented children's relations with natural features already present in their play areas; thus, their interaction around sand, grass and trees only could be observed. Their behaviours were associated with indicators of physical, social and cognitive play to measure the influence of these elements on the development of the children's skills. Documentation of these observations was done by taking notes, pictures, videos and sketches. The aim was to identify different behaviours around natural features and not to assess the time spent playing.

**Sand:** A group of observed children were playing in the sand using loose objects (bottles) filling them with sand and throwing it in the air. Children sometimes added water to their combinations and could accurately handle these mixtures with their hands. Parents unfortunately did not consider sand areas clean and hygienic. Children's play in sand was highly supervised by parents, who tended to closely watch their children play with reactions such as "*this is disgusting*" "*OMG you are playing with sand*".

The researchers observed that playing in the sand encouraged children to play in groups of two to four and interact on a personal basis. It also attracted other children to join even if they did not know each other; they made friends and played together. Sand play provided the opportunity for construction play; children built hills or mountains of sand and showed off their products, taking pride in what they built. Playing in sand encouraged some fantasy play; a group of children were recorded pretending to make a cake, then building a castle.



Figure 13. Children's play on sand. Sketch by author

**Grass:** On the other hand, children seemed to be more comfortable to play on grassy areas, they had the capacity to run, as they did not fear falling down and getting hurt while playing ball games or hide and seek. Some children made groups of two to three and played with a ball on grass, even in places where playing was not allowed.

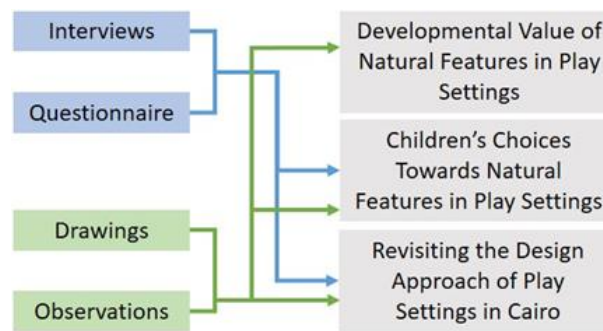
**Trees:** Children and families used trees as a shade for sitting and having a picnic in Al-Azhar Park where trees were not fenced and it was permissible to sit beneath them creating a pleasant picnic atmosphere. Unlike the other two settings, trees were fenced and adult seating was provided. In Shooting Club, a few children were observed trying to climb tree trunks, seldom succeeding in reaching the top, as they were strictly stopped by parents or security personnel. However, those who did succeed expressed a feeling of pride, calling their friends and parents to watch and take pictures.



## 4. Discussion

To draw conclusions for this study, fieldwork results obtained from the focus group's interviews, questionnaires and drawings, together with observations were correlated and compared with each other. Outcomes are to be interpreted under three main topics; benefits of playing in nature for developmental skills, children's choices and views of play in natural features and hence revisiting the design approach of traditional play settings in Cairo.

Results of children's interviews and questionnaires mainly provided answers for the question of children's choices towards natural play as well as giving an insight into the current designs of conventional play settings. Children's drawings and observations were used for the same two aspects in addition to insights about the developmental value of natural play features in children's play settings.



**Figure 14.** Triangulation of methods to answer research questions

### 4.1. Developmental value of natural features

Although children did not express an appreciation for the benefits of natural features in their play settings through the interviews, they did however express this through their responses to the visual questionnaire as well as their drawings and observed behaviour. The observations noted by the researcher showed that natural environments provided children with some opportunities for physical, social and cognitive play. The research found that children's physical benefits from playing in nature included exercising, stretching the muscles and fine motor skills. Cognitive benefits included widening their brain activities, testing their limits, conquering fears, discovering new opportunities and solving problems. Social benefits included meeting their friends and developing a sense of independence, aligning with literature (Casey, 2007; Burdette & Whitaker, 2005; Ginsburg, 2007; Kamal, 2019; Tovey, 2007).

#### *Physical Opportunities*

Outdoor green areas studied were found to offer places where children felt comfortable to run; a gross motor activity that burns fats and calories and moves body parts (Koplan *et al.*, 1982). Playing with fine particles such as sand helped develop fine motor skills and hand eye co-ordination. Climbing trees or even trying to climb without succeeding develops strong muscles and fitness skills in children (Gull *et al.*, 2018).

These findings are supported by previous research on school grounds in Canada, which stated that children playing on playgrounds rich with nature have better physical health compared to those who play on equipment-based playgrounds (Dyment *et al.*, 2009).

### *Social Opportunities*

Sand play offered a space for communication skills between children as it encouraged pretend play, where children for example pretended sand was food and improvised accordingly. They were observed playing in the sand in groups and they were found to interact on a personal basis. It also attracted other children to build new relations. Children seemed to enjoy feeling free in nature, as they were noticed playing barefoot enjoying stepping in sand and running on grass. This was mostly noticeable in Al-Azhar Park. Children said they liked grassy areas where they can play hide and seek or play with a ball.

Thus, the study suggests that playing in nature enhances their sense of freedom and independence in choosing what to do and where. Picnics beneath trees and ball games on grass as a pattern of activity highly develops social skills, communication and making friends. Climbing trees in general enhances the children's feeling of pride and creates a sense of competition (Gull *et al.*, 2018).

Social activities offered by natural green features were shown in children's drawings; where a child drew a group of children gathered to plant some plants. This indicated one way or another that planting is an activity that encourages group play, negotiations and other social skills.

In alignment, van Dijk-Wesselius *et al.* (2022) observed the difference in children's play behaviour before and after greening their schoolyard. Whereas after the greening process, an increase in constructive and explorative play behaviour and a decrease in passive non-play behaviours were observed.



**Figure 15.** Social aspects of nature in children's

### *Cognitive opportunities*

Natural environments with all their features are seen to be changeable and flexible. For this reason, children noticeably had infinite possibilities of playing with nature, building and imagining different settings and experiencing numerous situations. This is what Kellert mentioned as having opportunities of developing cognitive skills by naming, sorting, classifying, differentiating and solving problems. He claimed that this wealth of opportunities could hardly be found in any play environment that lacks natural features (Kellert, 2002).

In this study, children were observed using problem solving skills when they used forks and empty food boxes that they had found around them to play with in sand. Fantasy play encouraged by sand presented a method to stimulate cognitive skills, opened up their imagination and stimulated their creativity skills. It was observed that some children were trying to find a way to play in the sand and build something without their clothes getting dirty, so they started suggesting ideas to do so using their imagination. Sand also provided the opportunity for construction play; children built hills or mountains of sand and showed off their products, which enhanced their sense of pride.

## **4.2. Children's views towards natural features**

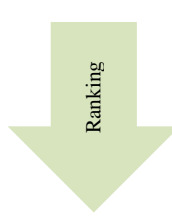
When children were asked about their preference for playing outdoors the majority confirmed that they liked to play outdoors and gave their reasons. However, this was

opposite to their choices for a favourite play element where the majority chose a built equipment rather than a natural feature. Literature suggests that children do not have the opportunity to play outdoors nowadays as they did in the past. Thus, children choosing play structures rather than natural elements could be relevant to Moore's theory that states that places and objects derive their significance for children from their use (Moore, 1986). Hence, it can be explained that children preferred the built steel structures to play on rather than other features because this is what was available on their play settings and where they have already experienced having fun. It can be alleged that if natural elements were available, their preference would have probably gone to that.

Children's responses to most of the natural features showed a clear wavering between: interest in play, concern over getting dirty and hurt in addition to worry about their parents' objection. Regarding vegetation there was an added concern that playing with trees or plants would damage them. They liked trees for their shade and because they can spin around them. Similarly, children had positive responses towards playing on grass, sand, animals and planting but again hygiene and parent approval to get into dirty activities were the concerns. Mud, rocks and wood were however the least popular and this was apparent in their drawings as well.

Children's choices and ranking of favourite objects in their settings can be summarized to current preferences and dream wishes. Current preferences were deducted from the interviews and observations on current settings while dream wishes were deducted from the visual questionnaire and drawing activities.

**Table 4.** Ranking and comparing children's current and future preferences



<b>Current preferences</b>	<b>Dream wishes</b>
<i>From interviews and observations</i>	<i>From questionnaire and drawings</i>
Play structures/Elevated places	Nature (water, trees, animals)
Pretend play opportunities	Play structures/Elevated places
Nature	Loose parts

These results align with the findings of the Egyptian study (Zalat, 2010), which investigated schoolchildren and adolescents' opinions of their current environment. The study compared actual settings with children's' desired environments as expressed in their drawings. Their drawings showed more natural elements, than those existing in their actual settings. They included items such as the sun, clouds and roses; as well as images of children playing football, trees, a beach, an umbrella, palm trees and a flock of birds.

### **4.3. Revisiting the design approach**

It was apparent in the studied settings, that there was what Parson called an 'indirect relation with nature', where children deal with natural elements with great restrictions and limitations (Parsons, 2011). The three case studies showed that managements of relevant play areas and the children's parents as well believe that fencing the natural elements was preferred to protect nature and sometimes to protect the children themselves and to teach them to care about them. The issue of hygiene raised by parents and their reaction towards creative playing with sand, however was considered by (Davis *et al.*, 2009) who suggested solutions to offer children a creative play opportunity and overcome hygiene issues by regular maintenance and a drainage system.

Comparing the current design of the play settings in the case study to those aspired by children; deducted from their drawings and visual questionnaire answers; it can be said that the ratio of natural elements and allowed interaction with them totally contradict each other. In conclusion, one can allege that the current design approach labelled in the literature as ‘conventional’ goes against what the research showed about children’s preference of natural elements in play settings and the positive impact of nature on the children’s proper development.

**5. Conclusions and implications**

The conclusions are drawn from the discussed data in three main aspects, the first of which is the developmental value of natural elements showing the skills and behaviours related to natural features. Secondly, the children’s views and preferences towards nature, and lastly the necessity of revisiting the design approach of conventional playgrounds.

Fieldwork with children deduces that playing outdoors is necessary for their development, which was also supported in the literature. However, children between ages six and eight in current Cairene play settings are not getting enough direct contact with nature and natural features and therefore lack opportunities for better play and development. Nature provides children with opportunities for physical, social and cognitive play.

**Table 5.** Summary of the skills and behaviours observed around the available natural features in the three settings

Feature	Physical skills	Social skills	Cognitive skills
<b>Trees</b>	<ul style="list-style-type: none"> <li>- Climbing: Strong muscles.</li> <li>- Spinning around.</li> <li>- Swinging</li> </ul>	<ul style="list-style-type: none"> <li>- Sitting in the shade: social relations.</li> <li>- Climbing: competence &amp; pride in accomplishments</li> <li>- Taking turns.</li> <li>- Leadership</li> </ul>	<ul style="list-style-type: none"> <li>- Learning about growth &amp; natural phenomena</li> <li>- classification</li> </ul>
<b>Sand</b>	<ul style="list-style-type: none"> <li>- Hand- eye</li> <li>- co-ordination</li> </ul>	<ul style="list-style-type: none"> <li>- Group play</li> <li>- Building new relations</li> <li>- Pride in accomplishments</li> </ul>	<ul style="list-style-type: none"> <li>- Creativity in pretend play.</li> <li>- Learning natural phenomena.</li> <li>- Decision-making.</li> <li>- Mathematical thinking.</li> <li>- Scientific reasoning. Problem solving.</li> </ul>
<b>Grass/ Vegetation</b>	<ul style="list-style-type: none"> <li>Running- ball games</li> <li>- Crawling- hiding</li> <li>- Somersaulting</li> <li>- Jumping</li> <li>- Rolling</li> </ul>	<ul style="list-style-type: none"> <li>- Group play</li> <li>- Sharing ideas</li> <li>- Co-operation</li> <li>- Independence</li> <li>- Freedom</li> </ul>	<ul style="list-style-type: none"> <li>- Learning about growth and natural phenomena</li> <li>- Naming</li> <li>- Sorting –classifying- differentiating.</li> <li>- Stimulating senses.</li> </ul>

In conclusion, children do prefer and choose to play in natural settings although not directly understanding the benefits of outdoor play for their health and development. Yet, sadly the majority of the currently available playgrounds around Cairo are dominated by manufactured play structures, with no space for children to freely experience nature, despite their obvious interest in nature shown by their drawings and answers to the interviews and questionnaires.

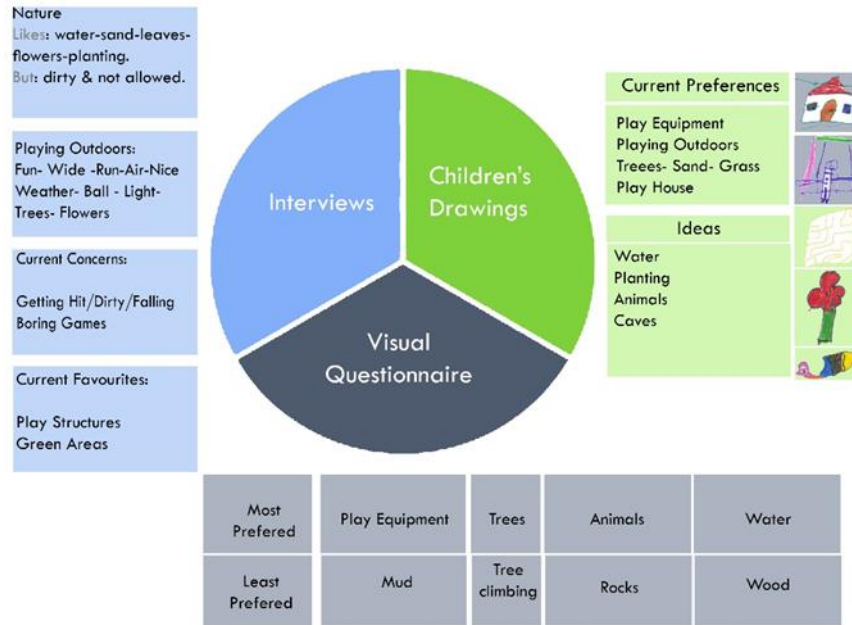


Figure 16. Summary of outcomes from workshops with children. *Diagram constructed by author*

## 6. Limitations and suggestions for future research

Some limitations of research with children need to be mentioned. Familiarity of an object or element might affect its significance for children, giving it higher ranks than other non-familiar objects. Children's impressions might be affected by the specific photograph or sentence shown to them by the researcher not giving a 100% true response to the element in general. These reliability concerns have been lessened as much as possible by the concept of triangulation.

The number of children participating is a limitation, however, the sample covers children from different backgrounds attending to private and public play areas and thus could be considered a well representation of the Egyptian middle class socio-economic class. Further studies with larger numbers of participants would be useful to further confirm or oppose the results of the current study.

### *Suggestions for future research and application*

This research will motivate further research on characteristics of skill-developing play spaces for children. It recommends giving more research attention to designing children's play areas and reconsidering the current design approach. Parents and adults' opinions, concerns and preferences were not the main drive of this study; however, it is true that a play space could serve a range of users, adults included. This aspect could be subject to a future study, to listen to adults and include them in the design process for a more inclusive play space design that accommodates the whole family.

This research should give inspiration for designers to work on developing children's skills through their designed play settings. It is recommended to listen to children and take their thoughts and ideas into account as a concept or schematic idea before design, or even including children with deeper levels of involvement such as consultation and participation. The recommended nature-based approach should not only be restricted to play areas in clubs and parks, but also include schoolyards and outdoor public spaces. Recent attention has been given to nature-engagement opportunities in farm

environments. Much is still needed to widely adopt nature- related play areas in public spaces.

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