EXAMINATION OF DESING CRITERIA FOR CHILDREN'S PLAYGROUNDS; THE TATVAN BOARDWALK CASE STUDY

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ABSTRACT

In the era when concretization has increased and technology has developed, physical activity of children has also decreased in parallel with these developments. Decreased physical activity negatively affects the physical, mental and social development of children. Decreasing activity levels have increased the importance of children's playgrounds as a result of intense urbanization. Proper planning and design of children's playgrounds positively affects the quality of activity in playgrounds. In this study, the design criteria of children's playgrounds was scrutinized under the headings of 'Safety,' 'Durability,' 'Ease of Use,' Aesthetics,' 'Floor Element Selection,' 'Playground Equipment Selection,' 'Flora Selection,' and 'Topography According to Ground Infrastructural Features.' Within the scope of this study, the children's playgrounds located along the boardwalk of Bitlis province's Tatvan provincial district were examined based on design criteria according to their qualitative characteristics. Qualitative and quantitative research methods were used in the study process. As a result of the study, it was determined that said children's playgrounds along the Tatvan coastline were not built according to universal design criteria.

Keywords: Playgrounds, Universality, Children

1.INTRODUCTION

Children are individuals who will transfer the generation they live in to future generations and create the future structure of social consciousness. In addition to the fact that education starts in the family and continues with scholastic education, the age of playing also has a great impact upon child development. One of the most important factors for kids to complete their development from birth to adulthood is to play with other kids of their age group. Playing games is a tool that supports children's motivation to act and explore. In providing the opportunity to play games in groups, children's playgrounds have an important place in complimenting their developmental period in a healthy way. Playing in groups contributes to the

development of children not only physically, but emotionally, mentally and socially as well. Playing games is an opportunity for kids to explore their physical characteristics, express themselves, contribute to their mental development, socialize and bond. They can develop cooperation, taking responsibility, inclination to teamwork, and empathy skills through games. They learn to accept defeat, obey rules, cope with jealousy, and control anger by playing with other children of their own age group[1]. Every professional group that comes into contact with kids should have information about child development. In order to provide the playgrounds deemed necessary, architects, landscape architects and urban planners need to be aware of why the concept of playing is so important to kids. Thus, the most important issues in children's playground designs are children's playground design criteria[10]. A properly designed playground offers the child the opportunity to experience different experiences. In offering the opportunity to play games in groups, these areas allow children to evaluate their spare time, to satisfy the learning and movement instinct that affects the development process, to become aware of the necessities of living together with the society in the preschool period, and to spend more quality time with their family. In these correct designs that develop the child physically, socially, emotionally and mentally, starting from the topography of the park area, safety, durability, ease of use, aesthetics, selection of playground equipment, ground, and vegetation planting criteria should be considered. A few picnic tables and a few swings do not qualify as a playground.

Such notions should be eliminated with the right designs, whereas necessary opportunities should be provided for every child to be given the chance to develop their physical and mental capacity in playgrounds they deserve[4, 13]. In this study, the kiddy playgrounds along the Tatvan boardwalk were evaluated based on the criteria that should be in children's playgrounds.

2. DESIGN CRITERIA OF CHILDREN'S PLAYGROUNDS

2.1. TOPOGRAPHY

The topographic structure of the environment where the spatial setup of children's playgrounds will be erected should be the first point of consideration while designing the park. The suitability for children of the topographic environs has an important place in shaping the design. In terms of safety, the presence of natural topographic areas such as mountainous areas and deep water bodies in the vicinity can put these children in danger. In addition, the presence of safe, uneven areas instead of the very flat topography allows different experiences to be experienced in the kid's playground. Instead of children's playgrounds limited to flat areas, spaces designed by creating interesting topographic mobility for children increases the time spent in these areas (Figure 1). Areas with adventurous and intriguing designs contribute to the development of a child's imagination. It is crucial to arrange natural hills and natural pits in children's playgrounds that can be easily accessed by children with disabilities, and to use natural materials during these arrangements. Pits and hillocks created by benefiting from the difference in elevation make it easier for children with disabilities to access other objects and play elements. Playgrounds designed in different forms and with topographic mobility offer disabled children the opportunity to move more easily and see everywhere, and enable children with wheelchairs to develop their perceptions, feel included, and develop self-confidence by playing games with other children[16].

Figure 1- Example of a children's playground designed as eneven. (Url 1)

2.2. SAFETY

One of the first principles to be considered when positioning game elements is safety. Providing the safety criteria in the designs of children's playgrounds is provided by the application of different designs as per various age groups. In terms of developing self-confidence in children, they need to feel safe and be able to move freely without fear of injury. oFor this reason, taking safety precautions against accidents and creating appropriate designs are an important criterion in the design of children's playgrounds. While each playground should be created by the designer by adhering to the design principles, compliance of the game elements in regards to safety and ergonomic standards should be tested, whereby adequacy of the measures against all types of accident risks should be considered[2,5].

Most accidents in playgrounds occur as a result of falls[18]. In order to prevent such situations, creating designs according to children's age groups can go a long way in preventing larger accidents. According to the universal design criteria, the climbing equipment in the playground should be no higher than 32" (81.28 cm) for kids aged 6-23 months who are just learning to walk. Spiral slides geared for the use of children in this age group need to be less than 360°. The presence of a safety lock in the swing design and the absence of gaps to prevent falling from the swing are other important factors to be considered in the design (Figure 2).

Figure 2- Example of a swing with a safety lock (Url 2)

The height criterion of the climbing element is 60'' (152.4 cm) for pre-school children between the ages of 2-5. Spiral slides for children in this age group can be designed for up to 360°. The availability of safety belts on playground swings prevents the danger of falling for kids in this age group whose motor skills are not fully developed. The designs in the climbing elements are more flexible for kids in the 5-12 age group, who are of the school period. The height of free standing climbing elements may be higher than 60'. Spiral kaydıraklar 360°' ye kadar tasarlanabilmektedir. Spiral slides can be designed up to 360°. Since steps and stairs pose a danger to children aged 6-23, the ramp element must be used at the designated spots. It is necessary to close off the playground with fences, and in larger cities security personnel or CCTV should be included in the design. If there are sharp-edged places on playground equipment, they should be identified and removed[20]. Apart from falling in playgrounds, another of the most common accidents is getting snagged (Figure 3). In playground designs, openings, gaps and spaces where children can get stuck and harm any limb should be properly dealt with in the plans without deviating from the standards[18].

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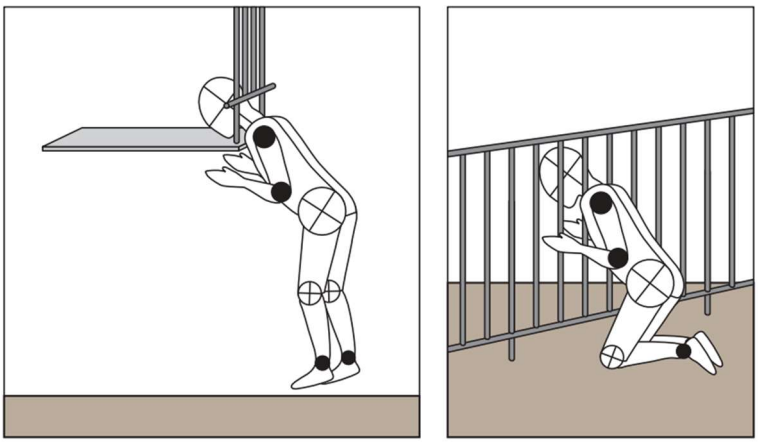

Figure 3- Examples of getting stuck beneath a barrier and between the vertical bars of a barrier[20]

2.3. DURABILITY

Depending on the intensity of use and the way they are used, play elements in the children's playgrounds should be regularly maintained and repaired. Choosing durable materials also leads to sustainability. Economically speaking, the selection of playground elements made of durable materials reduces costs. Instead of constantly replacing these elements, regular maintenance increases sustainability [19]. Visual and operational inspections at 1-3 month intervals as well as annual inspections as specified in the standards contribute to the safety of children's playground equipment by increasing their durability. In order to prevent falling, jamming and minor accidents while playing, it's an important requirement to ensure that playground equipment used continuously be made from durable materials[18].

2.4. EASE OF USAGE

Children's playgrounds should be designed in accordance with the use by children from different age groups. The fact that children with disabilities have a right to play is undeniable. Each element should be convenient to use and accessible for these individuals who may have difficulties in expressing themselves. While creating healthy play environments for children, disabled children should also be taken into account, whereas the principle of "design for all" should be adopted. All children are equal and it is the natural right of all to play, whether they have disabilities or not. For this reason, children with disabilities should also be considered while arranging playgrounds, materials and play equipment that will provide convenient usage should be selected, whereby the overall ground structure and mobility of the vicinity should be arranged accordingly (Pouya et al. 2016). For instance, gravel, wood or softer elements should be incorporated into the design for visually impaired children. The rotation directions and limits should be determined with the differences to be made in the floor and vertical elements. Direction finding and space perception can be achieved easier with larger plants and louder audio elements. For children with walking disabilities, ramps with reduced slopes and easily accessible play elements provide a place to play. The inclusion of colorful, vocal and attractive design elements in order to attract the attention of mentally retarded children allows the creation of ease of use by meeting the needs of all users[3].

2.5. AESTHETICS

Directly affecting the perception of space, the understanding of aesthetics is a concept that should be considered at the design stage in order to arouse interest and curiosity in children. Eye-catching designs boost the amount of time children will want to spend in these areas. As places where kids can develop their imagination, embark on mental and imaginary journeys in their own world, and develop their sense of adventure, playgrounds increase the desire to be involved in
play and activities. The use of playgrounds also increases in places that boost the level of excitement and keep kids interest in the playground high. Diversity in designs not only supports children's social, physical and mental development, but also allows them to use their creativity[11]. Color has great importance in the aesthetic appearance of children's playgrounds. While colors affect the physiological and psychological states of children, they stimulate their emotional and aesthetic values. Warm colors have an invigorating and exciting effect, while cool colors have a calming effect. Playground equipment also has a stylistic impact in making the playground preferable. It has been observed the quality of time spent in the

playground has increased with compositions where color, shape and shape harmony are processed together aesthetically[9].

2.6. SELECTION OF PLAYGROUND EQUIPMENT

Innovative, contemporary designs should be included when choosing playground equipment. The variety of activities is an important element to consider. Designing game elements that help them develop different games and contribute to their creativity not only increases children's excitement for the game, but also renders the use of space more efficient. In the selection of game elements, apparatus that is educational as well as entertaining should be chosen, and they should be aimed to foster develop the attribute of making up stories in their minds. Creating new games and playing with natural elements such as water and sand increase the activity level of children. In ensuring the availability of jogging and cycling paths, multi-directional and one-way swings, climbing areas, seesaws, wavy, straight, tube and spiral slides, sandboxes in children's playgrounds increases the rate of use of these areas, and it’s necessary to consider providing a suitable play environment for children during the design phase[21, 7, 8].

2.7. SELECTING THE PROPER FLOORING MATERIAL

When selecting flooring material for children's playgrounds, material that causes the least harm to children during accidents such as falling and injuries should be preferred. In other words, safely designed playground flooring should be paved to ensure fatal blows do not occur in accidents such as crashes and falls. At the same time, the ground must be flat and solid so that wheeled vehicles such as wheelchairs and baby prams for disabled children can be used comfortably. Although they are aesthetically pleasing to the eye, artificial turf, stone and asphalt surfaces are not recommended materials for safety. Since the use of concrete increases the risk of accidents in children's playgrounds, it is an element that needs plenty ofattention. On the other hand, natural grass is not amongst the materials considered suitable for use when rainy weather is taken into account[10]. From a series of research results, it has been decided that rubber floors are the most suitable material for children's playgrounds[18].

2.8. TREE PLANTING AND FLORA SELECTION

Tree planting and flora in children's playgrounds supports the ecological sustainability of the design. Bitki ve ağaç seçimi yaparken çocukların zarar görebileceği dikenli ve zararlı meyveleri olan, çocuk sağlığını olumsuz etkileyebilecek türlerin kullanılmamasına dikkat edilmelidir. When choosing plants and trees, care should be taken not to use species with thorns and toxic fruits that may harm children, and that may adversely affect children's health. Green spaces situated within the playgrounds, which attract the attention of children by providing aesthetics, provide privacy for children in terms of hindering noise and visual pollution. Since shrub derivatives and broad-leaved trees prevent children from receiving sunlight, which is crucial for bone development, smaller of trees and plant types should be used. When designing children's playgrounds, correct planting should be done by considering the senses that affect the perception of children. Care should be taken not to plant trees that produce fruit in summer and attract living things such as flies, insects, butterflies and bees[6,12].

3. MATERIAILS AND METHODS

3.1. RESEARCH PROBLEM

Over the past decade, the population of the city of Tatvan has increased more than the surrounding provinces and districts (Url 3). This was the reason the Tatvan boardwalk was selected as the case study. This increase has also led to concurrent rise in the child population. The increase in the population and the corresponding increased use of the children's playgrounds along the city's shoreline has led to the question of whether these playgrounds were designed according to proper design criteria.

3.2. METHODOLGY

Within the scope of the research, design criteria of children's playgrounds was investigated by conducting a literature review. It was within this context that the children's playgrounds along the Tatvan shoreline were evaluated (Figure 4). As a result of on-site observations conducted, the topographic condition, quality, maintenance status of each playground, quality of the elements constituting the playgrounds, seating areas, lighting, planting and security conditions are revealed in the table created (Table 1). Consequently, deficiencies were determined and suggestions were presented as a result of the evaluation.

3.3. RESEARCH SCOPE

Eight criteria points to be considered in the design of children's playgrounds were analyzed and exemplified within the scope of the research. These criteria include; Topography, Safety, Durability, Convenient Usage, Aesthetics, Selection of Playground Equipment, Selection of Ground Materials, Trees and Plants[15, 22, 2, 17, 14]. Each criterion has been examined as a result of the literature review.

3.4. SAMPLING AREA

The main crux of this research is the children's playgrounds on the shoreline of the Tatvan provincial district of Bitlis, situated at the coordinates of 38° 30′ 8″ North by 42° 16′ 53″ East. Administered by Bitlis province, Tatvan is a town on the west side of Lake Van. With a surface area of 1263 km^2 and a population of 92,695, Tatvan has a seven-km long shoreline and recreation area.

a. **b.**

Figure 4- a. Location of children's playgrounds along the shore of Tatvan **b.** Parks on Tatvan Boardwalk

4. RESEARCH FINDINGS

It is seen that the planning of the children's playgrounds along the Tatvan coastline, which comprises the case study area, was not planned independently, but rather by forming an integral whole with the beach. An attempt was made to postion the playgrounds at even intervals along the seven-kilometer long Tatvan shoreline. Situated at spots along the shore where all children on the beach can gain easy access, said children's playgrounds appeal to the age groups between 2-15. The common feature of all playgrounds found along this shore is that they are located on flat topography. As a result of the research and on-site observations, it is determined the playgrounds are in a state of neglect (Table 1). While the flooring is generally comprised of tile rubber coating, plastic, wood and steel materials were used for the playground apparatus. While this flooring has a low level of hardness, it provides only partial safety in cases such as falling. With the exception of playground No. 1, shortcomings have been determined with the slide ladders at all the other playground areas (Figure 5,6). The lack of sitting spaces for families to observe their children play was identified at playground No. 2. The playground encirclement element is not present at any of the playgrounds. As a result of observations, the reason for this was the presence of a recreation area around the playgrounds and the lack of an external element that may pose a threat to children. With the exception of playground No.5, there are no illumination elements which would solve the problem of desolation at night to an extent. The proximity of playground No. 5 to the vehicular road was found to be problematic in terms of security. There is a lack of fountains at all playgrounds. While considering that children's playgrounds are supportive and interesting for physical development, it has been determined that the case study playgrounds offer a limited number of activities.

Fig 5-No. 5 Playground

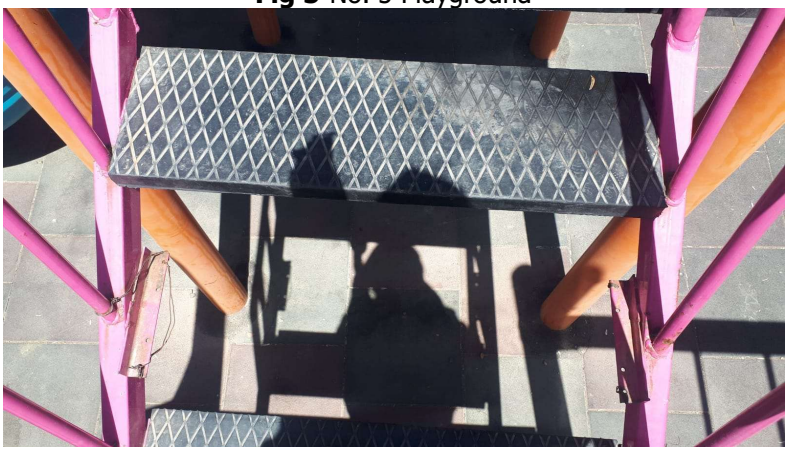

Fig 6-No. 3 Playground

The limited playground equipment in the playgrounds cannot ensure activities such as climbing, jumping and hanging. There is a climbing apparatus in playground No. 5 (Figure 7). The distance of playground No. 5 to the vehicular road was measured as 10 m. It has been determined children can reach moving traffic in a short distance. In terms of safety, the minimum distance of children's playgrounds to vehicular roads should be an average 30 m, although it differs for different age groups[13]. It was determined the distance of playground No. 3 to the vehicular road is 25 m. It has been observed that while trash receptacles are found in five of the playgrounds in the vicnity, said element is not found in playground No. 1, 3 and 5. As a result, throwing the packaging of food that children need onto the ground conveys a neglected appearance on the playgrounds. Considering the population density and the inadequacy of the playgrounds, it was determined the swing apparatus was sufficient for all users, but there were shortcomings in regards to the slides.

Fig 7- No. 5 playground

Fig 8- No. 2 playground

It was observed the play apparatus in the playgrounds are made of fiberglass, which is quite prevalent today. It was observed there are sharp and dangerous surfaces in areas where the steel wears out in playgrounds where steel apparatus are present. It is striking that some of the swings, which are linked to a steel pipe with chains consisting of 3 cm-long steel rungs, have snapped off and threaten safety (Figure 8). It was also determined that the trees in the playgrounds are insufficient and don't provide enough shade due to the fact they were recently planted. It was determined by observing at certain times over a period of two weeks that the hours the playgrounds were most actively used were between 4:00-6:00 PM, during the late-afternoon. No fountains were detected on any of the playgrounds. Water is an important need and element for children who spend a long time at the playground to produce games. Fountains, which are an important element in the water supply, are not made available at these playgrounds. As a result of interviews with the surrounding community, it was determined the children's playgrounds in this area have a large number of users, and many of them leave this area dissatisfied. It was determined as a result of the measurements that the slides at playground No. 1 offer different usage alternatives for the 6-23 month old, 2-5 year old and 5-12 year old groups (Figure 9). It was also observed there were no different alternatives for these three age groups in the seven other playgrounds.

a. **b.** **c.**

Figure 9- Playground No. 1 with slides for children of different age groups

It was observed that not all of the children's playgrounds in the case study area were designed for disabled children. It was also determined that different attractive color options were incorporated together at all the playgrounds. The ramp slope leading to the slides at playground No. 1 was measured at more than 8%. As a result of two weeks of observation, it was determined this slope caused climbing difficulties with children aged 2-5. With the exception of playgrounds No. 2 and 5, no other playground offered swings with seat belts to ensure the safety of children aged 6-24 months and 2-5 years (Figure 10).

Figure 10- Swing sets in playground No. 1.

Table 1- A qualitative evaluation of children's playgrounds along the Tatvan Shoreline.

CRITERIA / CHILDREN'S PLAYGROUND NAMES	NUMBER 1 CHILDREN'S PLAYGROUND	NUMBER 2 CHILDREN'S PLAYGROUND	NUMBER 3 CHILDREN'S PLAYGROUND	NUMBER 4 CHILDREN'S PLAYGROUND	NUMBER 5 CHILDREN'S PLAYGROUND
TOPOGRAPHY	-Without Slope	-Without Slope	-Without Slope	-Without Slope	-Without Slope
PLAY ELEMANT	-8 Swing, -2 Fiberglass See-Saws	-2 Swing, -Fiberglass playground consisting of 6 slides	-Fiberglass playground consisting of 3 slides	-2 Swing -Fiberglass playground consisting of 5 slides	-8 Swing -Climbing Apparatus with Wood and Rope Materials -Sports Equipment
SITTING AREA	✗	✗	Table Inside A Wooden Gazebo with Two Wooden S eating Units	Table Inside A Wooden Gazebo with Two Wooden S eating Units	Table Inside A Wooden Gazebo with Two Wooden S eating Units
GROUND	-Tiles Under the Play Apparatus -Corner Stone -Annual	-Tiles Under the Play Apparatus -Corner Stone -Annual	-Tiles Under the Play Apparatus -Corner Stone -Annual	-Tiles Under the Play Apparatus -Corner Stone -Annual	-Tiles Under the Play Apparatus -Corner Stone -Annual
PLAYGROUND ENCIRCLING APPARATUS	✗	✗	✗	✗	✗
BIN	5 Units	✗	1 Units	✗	2 Units
LIGHTING	✗	✗	✗	✗	3 Units
MAINTENANCE STATUS	Neglected	Neglected	Neglected	Neglected	Neglected
DISTANCE TO VEHICULAR ROAD	50 M	30 M	25 M	50 M	10 M
FLORA ELEMENTS	-Deciduous Saplings -Grass	-Deciduous Saplings -Grass	-Deciduous Saplings -Grass	-Deciduous Saplings -Grass	-Deciduous Saplings -Grass
ACTIVE HOURS	4:00-6:00 PM	4:00-6:00 PM	4:00-6:00 PM	4:00-6:00 PM	4:00-6:00 PM
FOUNTAIN	✗	✗	✗	✗	✗
MATERIALS USED	- Iron -Plastic -Wooden	- Iron -Plastic	- Iron -Plastic	- Iron -Plastic	- Iron -Plastic -Wooden

5. CONCLUSION

When planning for the layout ofchildren's playgrounds, which includes the design of the space, game elements, landscaping and equipment elements, is conducted in accordance with stated design criteria, playground expectations are met and user satisfaction is ensured. In cities where playgrounds are few and far between, and existing playgrounds are not given enough importance, design criteria should be considered and incorporated into the planning.

Within the scope of this case study, it was determined that the children's parks examined along the shores of Tatvan did not comply with the determined design criteria to a major extent. In order to ensure the correct layout for children's proper mental and physical development it is imperative that the pertinent authorities set up playgrounds in accordance with determined criteria during their planning phase. As a result of the observations, measurements and evaluations conducted on site, it was determined that the children's playgrounds erected along the shores of Tatvan, selected as the case study location, did not comply with any of the criteria of topography, safety, durability, convenience usage, aesthetics, selection of playground equipment, flooring, tree planting and flora selection.

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