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An Investigation of Sakarya Aziz Duran Park in the Context of Universal Design Principles

Mustafa ERGEN [1], Alev AD [2], Ömer Faruk UZUN [3]*

ORCID 1: 0000-0001-8320-9130
ORCID 2: 0009-0000-4173-0614
ORCID 3: 0000-0002-8541-4098

[1,3] *Sakarya University of Applied Sciences, Faculty of Agriculture, Department of Landscape Architecture, 54580, Sakarya, Türkiye.*

[2] *Sakarya University of Applied Sciences, Graduate Education Institute, Department of Landscape Architecture, 54187, Sakarya, Türkiye.*

**** e-mail**: omerfarukuzun@subu.edu.tr*

Abstract

This study examines the children's playgrounds located in Aziz Duran Park (Kent Park), which is established on the former site of the Agricultural Equipment Institution Factory in the Mithatpaşa neighborhood of Sakarya, Türkiye, in line with universal design principles. The research proceeds in four stages. In the first stage, a comprehensive literature review is carried out, and the study area is identified. In the second, field observations and on-site inspections are performed, accompanied by photographic documentation of outdoor elements such as entrances, ramps, stairs, walkways, and playgrounds. In the third stage, Aziz Duran Park is evaluated through 22 indicators based on universal design principles. The findings indicate that approximately 68% of the park complies with these principles, with 15 indicators deemed "suitable" and 7 "not suitable." In the final stage, the study offers a set of recommendations aimed at addressing the identified deficiencies and enhancing the park's inclusivity and accessibility.

Keywords: *Universal design principles, children's playgrounds, landscape design, Sakarya, Aziz Duran Park.*

Sakarya Aziz Duran Parkı'nın Evrensel Tasarım İlkeleri Açısından İncelenmesi

Öz

Bu çalışmada, Türkiye'nin Sakarya ili Mithatpaşa Mahallesi'nde bulunan eski Zirai Donatım Kurumu Fabrikası arazisine inşa edilen Aziz Duran Parkı'nda (Kent Park) bulunan çocuk oyun alanlarını evrensel tasarım ilkelerine göre incelenmesi ve karşılaşılan sorunların tespit edilmesi hedeflenmiştir. Çalışma dört aşamada gerçekleştirilmiştir. İlk aşamada, konu ile ilgili literatür taraması yapılmış ve çalışma alanı seçilmiştir. İkinci aşamada, arazi çalışması ve yerinde incelemeler yapılarak dış mekân düzenlemeleri (girişler, rampalar, merdivenler, yürüme yolları, çocuk oyun alanları vb.) fotoğraflanmıştır. Üçüncü aşamada, evrensel tasarım ilkelerine göre oluşturulan 22 gösterge arasında 15 "uygun" ve 7 "uygun değil" işaretine sahip olan Aziz Duran Parkı, yaklaşık %68 oranında uygun bir park olarak değerlendirilmiştir. Son aşamada ise park için ortaya çıkan eksikliklere yönelik çeşitli öneriler getirilmiştir.

Anahtar kelimeler: *Evrensel tasarım ilkeleri, çocuk oyun alanları, peyzaj tasarımı, Sakarya, Aziz Duran Parkı.*

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1. Introduction

Cities are places where people live together. Public open spaces play a crucial role in the development of cities, allowing individuals from diverse social backgrounds and cultures to come together, express themselves and their ideas, and coexist harmoniously (Erdönmez & Akı, 2005; Gezer & Gül, 2009). Urban parks serve as social spaces that allow both active and passive recreation of city dwellers. Parks are established in and around various neighbourhoods of the city. The materials used in urban parks are divided into two as living and non-living materials. Plants, which are living materials, are the most important parts of landscape design in urban open spaces. The largest volume of living materials are trees and shrubs (Akduman, 2012). Examples of non-living materials include various buildings, terraces, pools, pergolas, garden walls, walking paths, stairs, children's playgrounds, bridges, etc.

Like all members of society, people with disabilities have the right to take part in the community and live freely in social spaces. Ensuring accessibility requires successful planning. This can only be realised if planners, designers, manufacturers, managers, and other professional groups have a high level of awareness and skill on the subject. Legislation and financial support processes also play an important role in accessibility studies (Thiberg, 1996).

Observations made in Türkiye show that physical environments are full of architectural barriers that make it difficult for disabled people to access and use those environments. The most important reason why disabled people cannot participate in society is accessibility and physical environment problems. Roads, sidewalks, crosswalks, public buildings, parks and gardens, schools, residences, transportation vehicles, and many other components of the physical environment pose significant barriers to the social participation of individuals with disabilities (Karataş, 1998). The right studies for people with disabilities show that creating a common physical environment usable for all individuals is the right solution for people with disabilities to live independently and freely together (Bekiroğlu, 2002).

Children, who are another element of society like disabled individuals, have their own specific needs in the design of urban open spaces. Addressing these needs is essential for supporting children's physical and mental development. Play is one of the main factors in child development. One of the reasons why play has an important place in child development is that it supports the need for movement in infancy and early childhood (Emmett, 2012; Aksoy, 2011). In the individualization and development of the child, socialization and becoming a member of the society, the physical environment in which the child interacts one-to-one has a great influence (Tandoğan, 2014). According to Uluğ (2007), a child should have a playground rather than a toy (Çukur, 2009).

In this context, the concept of universal design comes to the fore in the design of urban open spaces. The concept of universal design, defined as 'the design of products, structures, or environments to be accessible to the widest possible range of individuals,' was introduced by Ronald Mace, an architect which is also disabled, in 1985 (Mace et al. 1991). Universal design includes all people regardless of language, religion, race, gender, national origin and physical differences. The difference of universal design from accessible design is that this concept is included from the beginning of the design process as a basic design input to meet the needs of everyone. Universal design is evaluated within the scope of seven principles: equitable use, flexibility in use, simple and intuitive use, perceptible information, tolerance for error, low physical effort, size and space for approach and use (NCSU, 1997). Universal design conception assumes that the diversity of human skills is not extraordinary, but rather ordinary (Ostroff, 2001). It aims to prevent the separation of individuals with differences from other individuals in designs.

Organizing children's playgrounds according to universal design principles is also important and necessary for all children with different needs due to the diversity of age groups and cultural identity to benefit equally from these areas.

There are various case studies that have been examined in terms of universal design principles. In the study conducted by Bayraktaroğlu and Büke (2015), the aim was to determine the current state and accessibility compliance of children's parks located along the longest pedestrian-accessible coastline on the Asian side of Istanbul. The study area was limited to the section between Fenerbahçe and

Pendik, where a continuous pedestrian axis exists, and the playgrounds within this axis were analyzed to identify deficiencies.

In the study by Koç & Koç (2022), a comparison was made between barrier-free parks in Eskişehir and Diyarbakır, and on-site observations revealed that these parks were not actively used by individuals with disabilities. It was emphasized that the inadequacy or inaccuracy of accessibility arrangements in park areas restricted their usability.

Similarly, in the study conducted by Seçme and Küçük (2020), field observations and measurements were carried out in Vali Recep Yazıcıoğlu Park to analyze the compliance of outdoor elements (entrances, ramps, stairs, walkways, etc.) with national and international standards, and various recommendations were developed.

This study aims to examine the accessibility of urban open spaces within the framework of universal design principles and highlight the importance of designing children's playgrounds in an inclusive manner for all individuals. Although various studies have been conducted on accessible playgrounds for children or individuals with disabilities (e.g., Karataş, 1998; Bekiroğlu, 2002; Emmett, 2012), this study differs by adopting a holistic approach that evaluates accessibility for both individuals with disabilities and children of different age groups within the same framework through the lens of universal design.

Within the scope of the study, how children's playgrounds can be made more inclusive in line with universal design principles has been investigated. In this way, recommendations will be developed to ensure that urban open spaces are accessible to everyone, providing a new perspective that will guide designers, planners, and local governments.

1.1. The Concept of Urban Open-Green Area

Open spaces are defined as natural and/or unbuilt urban landscapes, which are located in planned areas within the city boundaries, in public and private ownership, regulated/designed or unregulated, and unbuilt land inside and outside the city with a specific land use feature (Aydemir et al. 1999; Keleş, 1980).

In accordance with the Zoning Law No. 3194, active green areas are divided in three different types as parks, children’s parks, and playgrounds. Areas such as picnic areas, botanical and zoological gardens, coppice forests used for recreation and afforestation areas are also included in passive green areas (Öztürk & Özdemir, 2013).

1.1.1. The classification of urban open and green areas

Urban open and green areas can be classified primarily as active and passive green areas. The relevant classes are explained below (Gül et al., 2020).

- *Urban active green areas:* These are areas that are organized for the purposes of entertainment, rest, health, etc. for the entire city dweller, and can also be commercial, and are open to direct use by the public. Examples include parks (neighborhood, district, city parks), children's playgrounds and gardens, sports and playgrounds, cemeteries, botanical gardens, zoos, fair and exhibition areas, vehicle and pedestrian paths, boulevards and medians, open parking lots, streets, shopping mall areas, hospital gardens, school gardens, etc.
- *Passive green areas:* These are public or private green areas that are open to everyone's use, but have limited use or are closed to public use, and are organized for purposes such as protection, aesthetics, economy, etc. Fruit and poplar plantations, nurseries, cemeteries, soil protection, etc. Examples include purposefully afforested areas, memorial forests, state forests, groves, green areas around ancient monuments and culturally organized uses, etc.

Otherwise, urban open-green areas can be classified under 3 groups as public, semi-private and private areas according to their usage status. The relevant classes are explained below (Önder, 1997).

- Public (General) Open Green Areas refer to spaces accessible to the general public where all recreational needs are met (such as city and neighborhood parks, urban forests and coppice forests, cemeteries, botanical gardens, zoos, fairgrounds, exhibition areas, roads, boulevards, refuges, and sports fields).
- Semi-Private Open Green Areas are spaces not typically used by the entire public, but rather by the employees of institutions, their families, or specific groups under certain conditions (such as schools, military areas, public institutions, and factory gardens).
- Private Open Green Areas are spaces reserved for use by their owners in privately owned areas (such as private residences or public housing).

Open green areas within the city are classified under 4 groups as housing level, neighbourhood unit level, neighbourhood-district level and city level according to their functions and activities within the urban unit they serve. The relevant classes are explained below (Yıldızcı, 1982).

- *Green Areas at Housing Level:* These are the smallest green area units, including gardens, terrace and roof gardens, and balcony arrangements of single or multi-story houses. Their size, function, and aesthetic qualities depend on the cultural and economic status of the owners, as well as the physical and social characteristics of the city.
- *Green Areas at the Neighbourhood Unit Level:* This urban unit typically consists of 6 to 400 houses, accommodating between 30 and 5,000 inhabitants, and covering an area of up to 15 hectares. Green spaces at this level include children's gardens, sports fields, playgrounds, and collective housing gardens.
- *Green Areas at the Neighbourhood-District Level:* This unit serves a population of at least 15,000 people, covering an area of 15 hectares, and comprises three neighbourhood units. It includes neighbourhood parks, sports fields, playgrounds, and school gardens.
- *Green Areas at City Level:* These green spaces are designed to serve the entire city population. As the population and building density of settlements increase, the demand for such areas grows. Green spaces at this level should serve a population of 45,000, cover at least 135 hectares, and provide for at least 350 people per hectare, which is triple the size of neighbourhood-district level green areas. These spaces include sports complexes, recreational areas, zoos, botanical gardens, fairgrounds, exhibition areas, urban roads, boulevards, pedestrian paths, urban forests, green belts, cemeteries, and city parks.

1.2. The Concept of Urban Park

Today, people living in an intense urban life must continue their lives around the life offered by the cities they live in. Local governments in cities are continuously setting higher targets to increase the amount of green space per capita. City parks are the most well-known and used open green areas of high social importance around the city.

Urban parks are city parks that serve the whole city. Although it varies according to the size of the population, urban parks can vary between 40-400 hectares. The impact area of an urban park is between 3200-4000 m. Access to these areas is 30-60 minutes walking distance and 5-20 km away by motor vehicles. In the planning of an urban park, the basic measures to be taken in the construction of the facilities are stated as the number of people to be served, the size of the land and the morphological structure (Dil, 2004).

Urban parks are mostly a part of the visual city located in the residential center of the city. They are areas easily accessible for daily use, facilitating both individual and group activities (Lynch, 1981).

In addition, urban parks are public service areas where many important and various tasks have been added to the reconstruction of separated nature and human relations that have developed as a condition of urbanization within complex urban formations.

1.3. Concepts of Universal Design and Children's Playgrounds

The physical and mental structures and abilities of all individuals differ from each other. Universal design is a way of designing the environment we are in as a common solution for all differences (Figure 1).

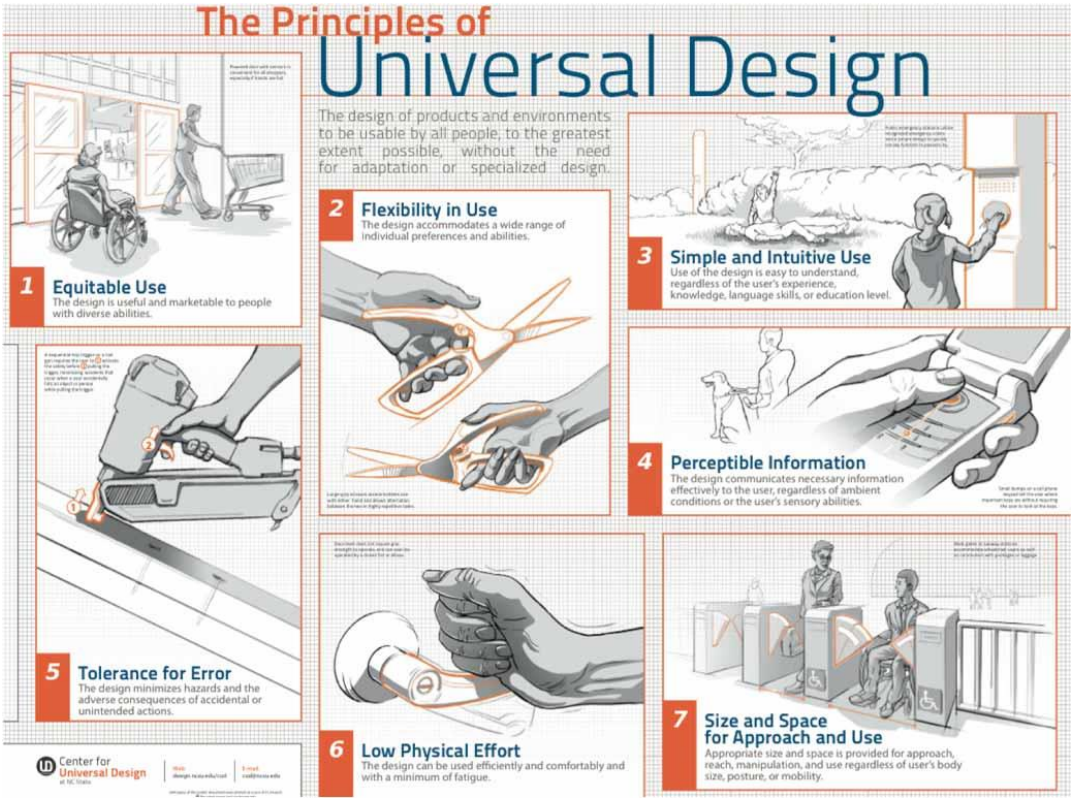

Figure 1. Universal design principles (NCSU, 1997)

In recent years, the concept of 'universal design' has been used in environmental planning, legal regulations in services and products in many countries of the world. The basis of universal design is to produce and design a common solution despite the physical and cultural differences of women, men, old, young and children from different ethnic origins, living in different regions.

The main purpose of this concept is the planning of areas where people are provided with ease of access and freedom of choice without making extra effort and without the need for special solutions. Creating highly perceptible, reassuring and qualified environments is also one of the main objectives of universal design.

'Universal Design' means that products, the environment, programmes and services can be used by everyone without the need for any special additional design or arrangement. However, this does not ignore the fact that assistive devices should be integrated for some disabled groups (Milletlerarası Sözleşme, 2009).

With the universal design approach becoming widespread, there have been many theoretical studies focusing on and seeking solutions to the problems related to children's playgrounds and the physical and social environment they offer, and their results have begun to be seen in practice. In Türkiye, it is observed that the existing children's playgrounds lag behind these criteria when universal design principles are taken into consideration.

This situation also indicates the lack of theoretical infrastructure on the subject. This study aims to contribute to the existing literature on the topic in Türkiye and to support the application of universal design principles in future children's playgrounds.

1.3.1. Universal design principles

Universal design principles are a set of principles that aim to create accessible, useful and aesthetically satisfying environments for all individuals despite their physical, mental and cultural differences. Universal design principles are categorized under 7 headings (Seçme & Küçük, 2020):

(1) Equitable Use Principle: The designs should be such that all individuals can use them equally. There should be no discrimination between users and no privilege for individuals. Equal security should be provided, and care should be taken for all users.

(2) Flexibility in Use Principle: It is the ability of users to use the design in line with their personal preferences, abilities or talents.

(3) Simple and Intuitive Use Principle: It is the creation of designs that user individuals can easily use and are simple to perceive. The designs should be simple and plain, not complex.

(4) Perceptible Information Principle: It is the ability to transfer information effectively to the individuals regardless of their sensory abilities and characteristics. All user individuals should be able to get the necessary information from the design and the information should be perceived in the same way by all user individuals.

(5) Tolerance for Error Principle in Design: The universal design should protect all user individuals from possible hazards and accidents. It should protect the users from accidents that may occur and minimize the consequences of accidents.

(6) Low Physical Effort Principle: These are the products or spaces that user individuals can use comfortably and get tired at minimum level. It should be designed in accordance with the physical capabilities of the user individuals.

(7) Principle of Providing Size and Space for Approach and Use: Areas should be created in accordance with the body size, posture and movement patterns of the user individuals. Adequate spaces should be created for user individuals who provide accessibility with assistance.

These principles guide designers to understand the concept of universal design. Designers who embrace universal design will produce healthier work guided by these principles.

2. Material and Method

2.1. Material

The primary focus of this study is Aziz Duran Park (Kent Park) in Sakarya city center. Chosen as the study area, Aziz Duran Park is situated within the Adapazarı district of Sakarya province (see Figure 2). It is the largest open green area and park in the city, covering an area of 160,000 m² in Adapazarı city center (Kahya & Yerli, 2018).

Figure 2. Aziz Duran Park (Kent Park) location (Google Earth, 2024)

Aziz Duran Park is an area with a total of 4500 metres of walking paths, as well as the Historical Wheel, one of the symbols of Sakarya, a 14,000 m^2 pond built in the middle of the park and small islets that create natural habitats for animals and bridges connecting them (Figure 3) (Kahya & Yerli 2018).

Figure 3. Photographs of ponds, islets and bridges (Authors)

Aziz Duran Park has a restaurant, a tennis court, an indoor swimming pool, water reservoirs, children's playgrounds, tea gardens, sales points, a library, a book cafe, a windmill, a fountain, camellias, sitting-recreation areas under trees, sales units, a bicycle rental point, Sakarya Plane Cafe and a security point (Figures 4, 5 and 6). The park hosts many events such as concert organizations and the Tulip festival, which is held regularly every year (Kahya & Yerli 2018).

Figure 4. Photographs from Sakarya swimming pool and bicycle rental point (Authors)

Figure 5. Photos from the sales unit, pond promenade and restaurant (Authors)

Figure 6. Photos from Aziz Duran Park security supervision, administrative supervision, and security point (Authors)

2.2. Method

The method of the study consists of 4 stages (Figure 10). In the first stage, literature reviews on the subject (from books, theses, articles, papers, notices, internet sites, etc.) were conducted and the study area was determined. In the second stage, the current situation and accessibility status of the area (park entrance, pedestrian road, pavements, ramps, stairs) were determined and all physical design

elements (benches, garbage bins, lighting elements, picnic tables, flooring, etc.) in the park were identified by photographing (Figures 7, 8 and 9). The urban equipments in the park were observed.

Figure 7. Photos from east, north and south direction car park entrances (respectively from left to right) (Authors)

Figure 8. Photos from the car parks south and east entrances (respectively from left to right) (Authors)

Figure 9. Photographs of footpaths, bridges and riverside walkway (Authors)

In the third stage, the TSE 12576 Standards and universal design criteria were taken as basis in the examination of the current situation of the park, and in addition to these, subheadings were created as all gender groups, child users, disabled users, young users and elderly users (TSE, 2012).

Universal design principles and criteria in the form of a table were used in the evaluation of children's playgrounds in the park.

The assessment was conducted based on seven fundamental universal design principles (NCSU, 1997):

1. Equitable Use– The playground should be designed to be useful and accessible to people with diverse abilities.

2. Flexibility in Use– The design should accommodate a wide range of individual preferences and abilities.

3. Simple and Intuitive Use– The design should be easy to understand, regardless of the user's experience, knowledge, language skills, or concentration level.

4. Perceptible Information– The design should communicate necessary information effectively, regardless of ambient conditions or the user's sensory abilities.

5. Tolerance for Error– The design should minimize hazards and adverse consequences of accidental or unintended actions.

6. Low Physical Effort– The design should be usable efficiently and comfortably with minimal fatigue.

7. Size and Space for Approach and Use– Appropriate size and space should be provided for approach, reach, manipulation, and use, regardless of the user's body size, posture, or mobility.

Marking was made with 'suitable' and 'not-suitable' options in the table. In the last stage, suggestions were developed in line with the data obtained from the current situation.

Within the scope of the study, 'Microsoft Office' programmes were used as auxiliary materials in the writing stage, 'Google Earth' program was used to obtain satellite images and 'Iphone 8 Plus' mobile phone was used as photography material.

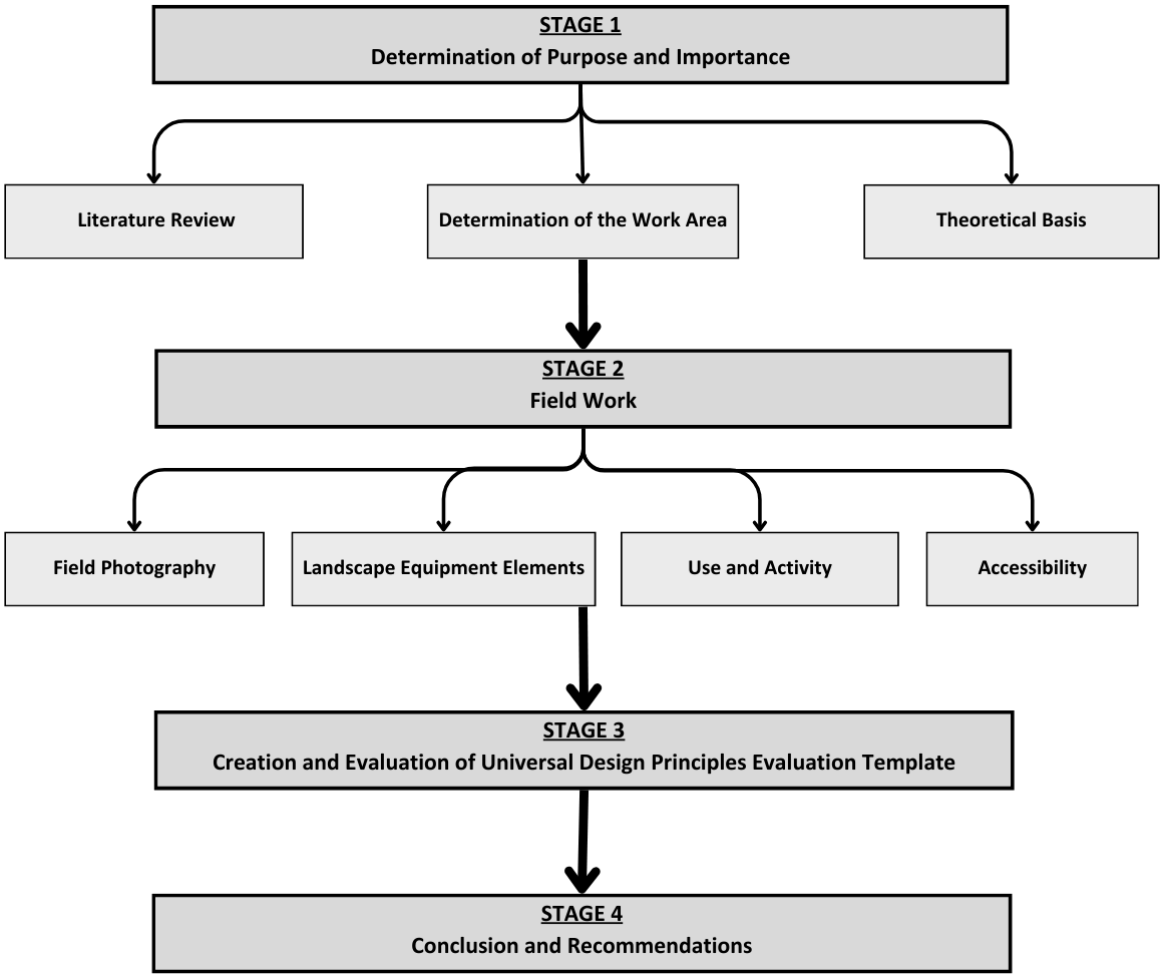

Figure 10. Workflow diagram of the study (Authors)

3. Findings

3.1. Findings for Aziz Duran Park

According to the findings obtained from the example of Aziz Duran Park in Sakarya in the light of the parameters determined according to universal design principles;

1) When the indicators in the principle of '*equitable use*' are evaluated, it is seen that there are common use areas for all gender groups, there are no special uses for young and elderly people, there are playgrounds and equipment in the park where children of different genders and physical abilities play together and there is no discrimination (Figure 12). Playgrounds are placed for common use. In Aziz Duran Park, there is a playground with playground equipment that creates different sounds for the visually impaired (Figure 11). However, not all parks have playground equipment that supports the common use of different types of disabilities (Figure 13).

Figure 11. A photo from the playgroup for visually impaired children (Authors)

Figure 12. Photos from the playground for all children (Authors)

Figure 13. Photographs of playgrounds that are not suitable for children with physical disabilities (Authors)

2) When the indicators in the principle of '*flexibility in use'* are evaluated, it has been observed that movable benches were not used in the design of the parks in terms of enabling different uses. Apparatus to offer alternatives for right and left-handed people were not developed, and playground equipment was not suitable for individual use of children (Figure 14). It was determined that no flexibility was provided for all gender groups, child-young-elderly groups.

Figure 14. Photos from the seating units (Authors)

3) When the indicators in the '*simple and intuitive use'* principle are evaluated, it is observed that there are different playgrounds, a skateboard track, seating areas and a pond in Aziz Duran Park. Throughout the park, children's playgrounds are located independently from each other, there is confusion between relationships and functions, and there are undefined spaces. In addition, areas that provide common use for all gender groups, children-young-elderly groups are designed (Figure 15).

Figure 15. Photographs of children's playgrounds located in different areas (Authors)

4) When the indicators in the '*perceptible information'* principle are evaluated, it is seen that Aziz Duran Park has main roads with a width of 2.5 m and side roads connected to it (Figure 16). It has been detected that the pavements on some of the roads have deteriorated. There are no direction signs at the entrance or inside the park. There is a sign for the hearing-impaired individuals in front of the restaurant and are various other warning signs at certain points for the Sakarya River passing through the west of the park (Figure 17). It has been revealed that there is partially perceptible information for all gender groups, child-young-elderly groups.

Figure 16. Photographs of the roads and problematic points inside the park (Authors)

Figure 17. Photographs of warning signs and information boards (Authors)

5) When the indicators in the principle of '*tolerance for error in design'* are evaluated, it is seen that there are swings for children with orthopedic disabilities in Aziz Duran Park, but the ramps are not designed in accordance with the standards. The flooring of different children's playgrounds in the park is not of a quality that will adversely affect children's health and is of a material that will not cause injury during play. It has been observed that design errors such as irregularity of the roads and elevation differences in the park have the potential to create problems especially for elderly users (Figure 18).

Figure 18. Photographs of playground equipment, ramps and flooring designed for children with disabilities (Authors)

6) When the indicators in the '*low physical effort'* principle are evaluated, the elevations of the playgrounds vary, while some areas are level with the grass area, some areas have elevation differences that may lead to accidents (Figure 19). In the playgrounds, ramps were detected in only one playground and were found to be appropriate while the slope solution of a secondary road was observed to be unsuitable for the disabled (Figures 20-22). Although there is a layout that will provide the least effort for all gender groups and young users, it has been determined that elderly users are not considered, and no design has been made to ensure this principle.

Figure 19. Photographs of children's playground and flooring designed by considering disabled children (Authors)

Figure 20. Photographs of stairs and lift for disabled in Sakarya Uçak Kafe (Authors)

Figure 21. Photos of the walkway made with natural stone paving (Authors)

Figure 22. Photos from lay-bys (Authors)

7) When the indicators in the principle of '*providing size and space for approach and use'* are evaluated, it is seen that public transport stops are located in the immediate vicinity of the area in Aziz Duran Park and public transport vehicles pass in front of the north and south entrances of the park, private vehicles can access the area, but there are car parks at the east and south entrances of the park, not in the area. In addition, it has been determined that there is an easy pedestrian access. When the conformity of the area to the standards in structural design is examined, it is seen that the roads are 2.5 m wide, the garbage bins are 65 cm high but not positioned at the right points and in sufficient number, the lighting elements are 2.20 m, which is a proper height for safety, but not aesthetic and many of the playground equipment are not in accordance with the standards (Figure 23).

Figure 23. Photos of litter bins and lighting elements (Authors)

Figure 24. Photographs from the stone paving application at the base of trees (Authors)

In plant design, it has been determined that plant species suitable for the climatic characteristics of the city were selected by taking into account their height and crown dimensions, but there was no diversity in terms of plant composition (Figures 24, 25).

Figure 25. Photos of some examples of planting design (Authors)

The evaluations of Aziz Duran Park which was examined in Sakarya province in terms of universal design principles are given in Table 1.

Table 1. Evaluation indicators of Sakarya Aziz Duran Park according to universal design principles (Created by utilizing Uslu et al. 2016; Sağlam Etlan & Aşur, 2021)

Universal Design Principles	Indicators		Compliance status of Aziz Duran Park with the criteria	
			Suitable	Not suitable
Equitable Use	Places where children of different genders can be together		×	
	Places where children with different physical characteristics can be together		×	
	Areas designed for all types of disabilities			×
Flexibility in Use	Providing preferences for different uses			×
	Simplicity in the overall design approach			×
Simple Use and Perceptibility	Hierarchy on the roads		×	
	Centre points and activity areas		×	
	Having signboards for informative and guiding purposes		×	
Tolerance for Error in Design	Use of safety preventive elements		×	
	Quality of play equipment		×	
Low Physical Effort	Having ramps, stairs and rest areas			×
	Ergonomic use and easy accessibility of equipment		×	
Size and Space for Approach and Use	Accessibility to Parks	Access to parks by public transport	×	
		Easy access for pedestrians	×	
		Car Parking	×	
	Structural Design	Roads	×	
		Ramps	×	
		Urban equipments	×	
		Children's play equipment		×
	Plant Design	Selection of suitable plant species		×
		Location and position of plants	×	
		Plant design		×

In the study, according to the universal design principles, it is revealed that the level of conformity of Aziz Duran Park in Sakarya province to the Universal Design Principles is moderate. As a result of the markings made in the Evaluation Table, analysis graphs regarding the suitability of the park were created (Figure 26).

As a result, Aziz Duran Park, which has 15 ‘suitable’ markings and 7 ‘not suitable’ markings among 22 indicators, is a park with suitable with approximately 68% rate.

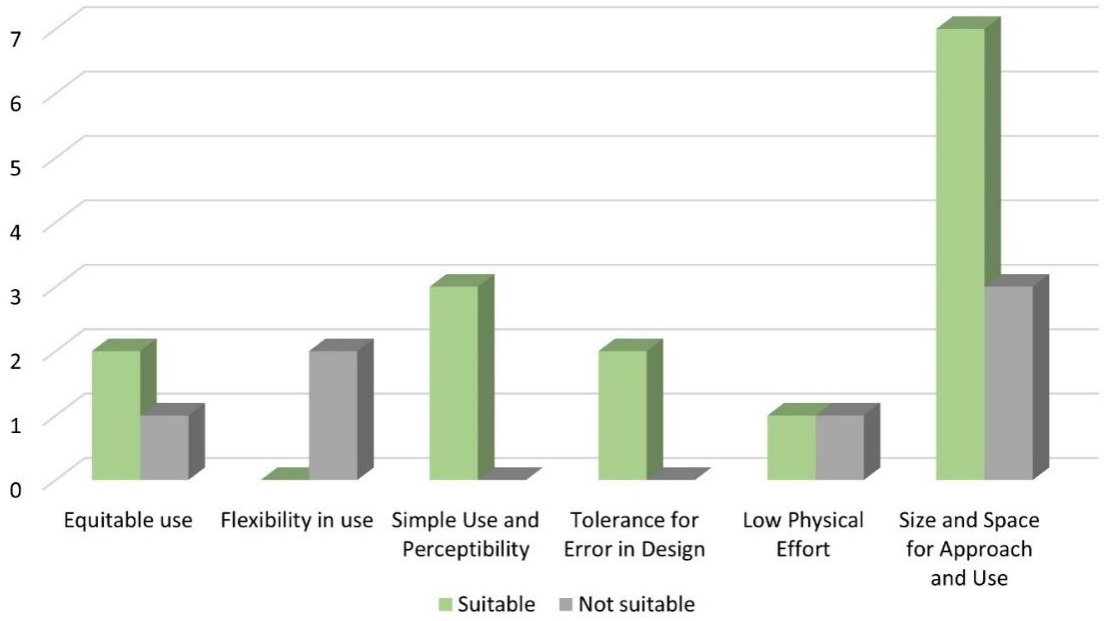

Figure 26. Suitability status of Aziz Duran Park in accordance with universal design principles (Authors)

3.2. Recommendations

Considering the current situation of the park and all the data obtained, various recommendations are presented within the scope of the study as follows.

Equitable Use:

- Ramps, wide roads and accessible toilets should be added for disabled individuals.
- Special picnic areas and seating arrangements should be made for wheelchair users.
- More play groups should be created for visually and hearing-impaired children in playgrounds.

Flexibility of Use:

- Playgrounds and sports areas that appeal to different age groups should be created.
- Playgrounds should be designed to appeal to children's different senses such as hearing, sight and touch.
- Movable benches can be incorporated into seating arrangements to accommodate individuals with mobility impairments and elderly users.

Simple and Intuitive Use:

- Direction signs and information boards should be added where necessary in the park.
- These signs and boards should be prepared with symbols and simple language that users can easily understand.

Perceptible Information:

- Braille alphabet can be used on information boards and visual enrichments can be made.
- By providing information in different languages, tourists can also benefit from the park easily.

Error Tolerance:

- Barriers can be added to the edges of the walkways and children's playgrounds can be surrounded by safety fences.
- Easily accessible first aid points can be established for emergencies.

Low Physical Effort:

- Rest areas, benches and shaded areas should be added at various points in the park.
- The slope of the walkways should be kept to a minimum and the surface structure should be smooth.

Appropriate Size and Area for Approach and Use:

- The width of the entrance-exit points of the park can be increased, the width of the walkways can be arranged so that everyone can use them comfortably, and the suitability of the seating areas can be reviewed.

Natural Elements:

- Children's playgrounds should incorporate natural materials and include elements that allow children to engage with nature.
- The use of natural elements (water, soil, animals, etc.) will contribute both to the development of children and ecologically.
- A visual experience and relaxing effect can be provided by creating resting and observation areas around the artificial pond.

Therapy Gardens:

- Therapy gardens can be incorporated into children's playgrounds to enhance the development of senses such as sight, hearing, touch, and smell.
- Colorful flowering plants, different floor coverings, objects that create sound, aromatic plants and tactile plant species can be placed.

Herbal Designs that evoke the seasonal transitions:

- The use of plant designs and informative plant identification signs that evoke the seasonal transitions should be encouraged.
- Stimuli such as bird nests, water sounds, wind chimes can be used at focal points.

Floor Coatings and Safety:

- Floor coverings, landscaping, and safety features in children's playgrounds and across the park should be evaluated and designed to address the needs and expectations of children with disabilities.

These recommendations can help to make Sakarya Aziz Duran Park in line with universal design principles and make the park more accessible and useful for everyone. These arrangements will improve the park experience of users by increasing the accessibility and sustainability of the park.

4. Discussion and Conclusion

This study emphasizes that universal design is a solution that aims to create common use areas for all individuals regardless of age, language, religion and race. Although there are many successful examples worldwide, it is seen that these principles are not sufficiently applied in the parks in our country. These deficiencies, which are especially evident in children's playgrounds, cause parks to fail to fulfill the function of children spending time together and socializing.

Successful applications of universal design in urban parks worldwide demonstrate how these principles can enhance inclusivity and usability. A building project included in the study was developed based on universal design, maximum accessibility, and sustainability principles to support accessibility and participation (Gossett et al. 2009). Similarly, in a study on large public spaces such as parks and beaches in Vladivostok, the main approaches to the landscape organization of the investigated spaces were determined based on the assessment of accessibility and ease of use (Kopeva et al. 2018).

In Türkiye, there are also noteworthy implementations of universal design in urban parks. Based on the projects carried out by local governments in Ankara under the name "Barrier-Free Parks," which aim to create accessible, safe, high-quality, and sustainable urban spaces, two parks stand out as significant examples: "Serçev Barrier-Free Playground" in Çankaya and "Martyr Specialist Corporal Murat Azizoğlu Park" in Keçiören. These parks provide accessible playgrounds, tactile guide paths, and ramp systems for different age groups and individuals with disabilities (Uslu et al. 2016). Similarly, Bayburt University Campus serves as a positive example with its wide walking paths and compliance with universal design principles, ensuring accessibility (Akıncı, 2016).

Research suggests that implementing universal design in urban parks not only benefits individuals with disabilities but also enhances overall user experience and social integration. By comparing these successful global and national implementations with the findings from Aziz Duran Park, it is evident that the park requires significant improvements to align with best practices. Addressing these deficiencies will not only improve accessibility but also foster inclusivity, social cohesion, and a more equitable urban environment.

To overcome these deficiencies, children's playgrounds in Aziz Duran Park were examined according to universal design principles and the findings obtained were evaluated. Within the scope of the research, the current situation assessment of the park and the extent to which the children's playgrounds in the park comply with the universal design principles are listed below:

Equal Use:

- It has been determined that most of the playgrounds in the park are not suitable for the use of children with disabilities. Elements such as ramps and accessible roads were found to be missing.
- While only one playground has play groups for visually and hearing-impaired children, the other playgrounds are not suitable for barrier-free design.

Flexibility of Use:

- The current state of the park is not flexible enough to appeal to different age and ability groups.
- Playgrounds do not allow individual use by children. Especially for individuals with mobility problems and elderly users, the lack of mobile benches in the seating elements was determined.

Simple and Intuitive Use:

- The lack of direction signs and information boards in the park or the lack of comprehensibility makes it difficult for users to access the park.

Perceptible Information:

- It was determined that elements such as the use of Braille alphabet for the visually impaired were missing, and there were no symbols and different language options on the information boards.

Fault Tolerance:

- It has been determined that children's playgrounds are not safe and there is a lack of barriers along the walking paths.

Low Physical Effort:

- It was determined that resting areas, sitting benches and shaded areas were insufficient at various points of the park. The slope and surface structure of the walking paths at some points also cause difficulties for the users.

Appropriate Size and Area for Approach and Use:

- The width of the entrance-exit points and walkways of the park is not sufficient, seating areas are not suitable.

These analyzes show that Aziz Duran Park is a moderately suitable park in terms of universal design principles. In line with the results of this study, various suggestions were made to improve the accessibility and utilization of the park. These suggestions include providing accessible infrastructure for people with disabilities, creating areas that appeal to different age groups, adding directional signs and information boards, providing information in Braille and different languages, making walking paths safe and smooth, using natural elements and therapy gardens. These recommendations will help to make the park in accordance with universal design principles and will improve the user experience by making it more accessible and useful for everyone. Additionally, this study will provide valuable insights into the application of universal design principles to children's playgrounds, contributing to the existing literature.

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Author Contribution and Conflict of Interest Declaration Information

All authors contributed equally to the article. There is no conflict of interest.

References

Akduman, D. G. (2012). Van kenti parklarının peyzaj mimarlığı açısından değerlendirilmesi (Unpublished master's thesis). Yüzüncü Yıl Üniversitesi, Fen Bilimleri Enstitüsü, Van.

Akıncı, G. M. (2016). Evrensel tasarım yaklaşımı: Bayburt Üniversitesi örneği. *Tasarım + Kuram*, 10(17), 16–26. https://doi.org/10.23835/tasarimkuram.239608

Aksoy, Y. (2011). Çocuk oyun alanları üzerine bir araştırma: İstanbul, Isparta, Eskişehir, Erzurum, Kayseri, Ankara, Zonguldak ve Trabzon illeri örneği. *İstanbul Aydın Üniversitesi Fen Bilimleri Dergisi*, 6, 82–106.

Aydemir, Ş., Aydemir, S. E., Beyazlı, D. Ş., Ökten, N., Öksüz, A. M., Sancar, C., Özyaba, M., & Türk, Y. A. (1999). *Kentsel alanların planlanması ve tasarımı* (pp. 287–342). Trabzon: Akademi Kitapevi.

Bayraktaroğlu, B., & Büke, A. (2015). Çocuk oyun alanlarının evrensellik ölçütleri açısından incelenmesi: Fenerbahçe–Pendik sahil şeridi örneği. *Süleyman Demirel Üniversitesi Mühendislik Bilimleri ve Tasarım Dergisi*, 3(3), (Special Issue: Ergonomi2015), 575–582.

Bekiroğlu, M. S. (2002). Peyzaj düzenlemelerinde özürlülerin kullanımları ile ilgili sorunların saptanması (Unpublished doctoral thesis). İstanbul Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.

Çukur, D. (2009). Çocuk dinlenimi açısından oyunun önemi ve konut yakın çevresinde oyun değerini artırıcı mekânsal düzenlemeler. *Ege Mimarlık*, 69, 14–17.

Dil, M. (2004). İstanbul'un yeşil alan sisteminin, planlama kriterleri açısından irdelenmesi (Unpublished master's thesis). İstanbul Teknik Üniversitesi, Fen Bilimleri Enstitüsü, İstanbul.

Erdönmez, M. E., & Akı, A. (2005). Açık kamusal kent mekanlarının toplum ilişkilerindeki etkileri. *Megaron Yıldız Teknik Üniversitesi Mimarlık Fakültesi e-Dergisi*, 1(1), 67–87.

Emmett, M. (2012). Universally designed playgrounds: Play place, an outdoor for all. Access Adress (08.10.2024):http://soundideas.pugetsound.edu/cgi/viewcontent.cgi?article=1039&context=ms_occ_therapy

Gezer, A. & Gül, A. (2009). *Kent Ormancılığı (Kavramsal, Teknik ve Kültürel Yaklaşımlar)*. Isparta: SDÜ Basımevi.

Google Earth. (2024). Aziz Duran Parkı Satellite map. Access Adress (08.10.2024): https://earth.google.com/web/@40.77265544,30.38844358,28.1569444a,1175.20650131d,30y,0h,0t,0r

Gossett, A., Mirza, M., Barnds, A. K., & Feidt, D. (2009). Beyond access: A case study on the intersection of accessibility, sustainability, and universal design. *Disability and Rehabilitation: Assistive Technology*, 4(6), 439–450. https://doi.org/10.3109/17483100903100301

Gül, A., Dinç, G., Akın, T., & Koçak, A. İ. (2020). Kentsel açık ve yeşil alanların mevcut yasal durumu ve uygulamadaki sorunlar. *İdealkent*, 11(Special Issue: Urbanization and Economy), 1281–1312. https://doi.org/10.31198/idealkent.650461

Kahya, C., & Yerli, Ö. (2018). Kentsel açık mekanlarda kullanıcı memnuniyeti değerlendirmesi: Adapazarı Kent Park örneği. *Düzce Üniversitesi Bilim ve Teknoloji Dergisi*, 6, 765–778.

Karataş, K. (1998). Özürlüler kentlerde özgürce yaşamak istiyorlar. *Ufkun Ötesi Aylık Dergi*, 2(4), 10–13.

Keleş, R. (1980). *Kentbilim terimleri sözlüğü*. Ankara: Türk Dil Kurumu Yayınları.

Koç, C., & Koç, A. (2022). Engelsiz parkların erişilebilirliği: Eskişehir ve Diyarbakır örnekleri. *Süleyman Demirel Üniversitesi Vizyoner Dergisi*, 13(33), 161–188.

Kopeva, A., Ivanova, O., & Zaitseva, T. (2018). Application of universal design principles for the adaptation of urban green recreational facilities for low-mobility groups: Vladivostok case-study. *IOP Conference Series: Materials Science and Engineering*, 463(2). https://doi.org/10.1088/1757-899X/463/2/022018

Lynch, K. (1981). *A theory of good city form*. MIT Press.

Mace, R. L., Hardie, G. J., & Place, J. P. (1991). Accessible environments: Toward universal design. In W. F. E. Preiser & E. Ostroff (Eds.), *Design intervention: Toward a more humane architecture*. New York: Van Nostrand Reinhold.

Milletlerarası Sözleşme. (2009, July 14). *Resmi Gazete*, Sayı: 27288. Access Adress (08.10.2024): http://www.resmigazete.gov.tr/eskiler/2009/07/20090714-1.htm

NCSU (Center for Universal Design) (1997). The Principles of Universal Design, Ver. 2.0, North Carolina State University, Raleigh, NC.

Ostroff, E. (2001). Universal design: The new paradigm. In W. F. E. Preiser & E. Ostroff (Eds.), *Universal design handbook.* New York: McGraw-Hill.

Önder, S. (1997). Konya kenti açık ve yeşil alan sisteminin saptanması üzerinde bir araştırma (Unpublished doctoral thesis). Ankara Üniversitesi, Fen Bilimleri Enstitüsü, Ankara.

Öztürk, S., & Özdemir, Z. (2013). Kentsel ve yeşil alanların yaşam kalitesine etkisi: Kastamonu örneği. *Kastamonu Üniversitesi Orman Fakültesi Dergisi*, (Special Issue), 109–116.

Sağlam Etlan, G., & Aşur, F. (2021). Evrensel tasarım ilkeleri doğrultusunda çocuk oyun alanlarının engelli çocuklar tarafından kullanılabilirliğinin incelenmesi: Van ili örneği. *ISPEC Journal of Agricultural Sciences*, 5(2), 333–343.

Seçme, M., & Küçük, V. (2020). Denizli Vali Recep Yazıcıoğlu (İncilipınar) Parkı'nın evrensel tasarım ve planlama bağlamında değerlendirilmesi. *Mimarlık Bilimleri ve Uygulamaları Dergisi*, 5(1), 93–107. https://doi.org/10.30785/mbud.667598

Tandoğan, O. (2014). Çocuk için daha yaşanılır bir kentsel mekân: Dünyada gerçekleştirilen uygulamalar. *Megaron*, 9(1), 19–33.

Thiberg, S. (1996). Engelsiz insan yerleşmelerine doğru. In *Diğerlerinin konut sorunları* (pp. 293–297). Ankara: TMMOB Mimarlar Odası.

TSE (Türk Standartları Enstitüsü). (2012). *TS 12576:2012: Şehir içi yollar – Kaldırım ve yaya geçitlerinde ulaşılabilirlik için yapısal önlemler ve işaretlemelerin tasarım kuralları*.

Uluğ, H. (2007). Kuzey Adana'daki çocuk oyun alanlarının bitki seçimi yönünden irdelenmesi (Unpublished master's thesis). Çukurova Üniversitesi, Fen Bilimleri Enstitüsü, Adana.

Uslu, A., Şahin Körmeçli, P., & Güneş, M. (2016). Engelsiz çocuk oyun alanlarının evrensel tasarım ilkelerine göre irdelenmesi: Ankara örneği. In *Ulusal 6. Peyzaj Mimarlığı Kongresi Bildiri Kitabı II. Cilt* (pp. 104–118), 8–11 Aralık 2016, Antalya, Türkiye.

Yıldızcı, A. C. (1982). *Kentsel yeşil alan planlaması ve İstanbul örneği* (Unpublished associate professorship thesis). İstanbul Teknik Üniversitesi, Mimarlık Bölümü, İstanbul.