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Disaster Awareness and Education Center-Park Design: Investigation of Outdoor Spaces on Graduation Project of Architecture Students

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Abstract: Introduction: Turkey has a history of various natural disasters. In architecture education, students need to be informed about natural disasters, produce information, and use the knowledge in their designs to play an essential role in shaping the built environment. The disaster awareness-education center and park aim to raise awareness and educate all segments of society about natural disasters and create practical solutions when necessary. **Objectives:** The research aims to systematically examine urban landscape design solutions to raise awareness of the architectural students about disasters through an exemplary disaster awareness park in Istanbul. The proposed landscapes are classified concerning disaster awareness level, education and training capacity and the potential to serve as a post-disaster meeting point and temporary management center. **Methods:** This research presents an architectural design process. The research uses landscape planning and design principles to evaluate student projects concerning the relationship between indoor spaces and disaster awareness and education parks in open areas. **Results:** Architecture graduate students have been successful in building outdoor-indoor connections, multi-purpose use of outdoor spaces, designing open space services, and solving services and meeting areas through their projects. However, their designs did not address planting, ecological and sustainable green space, and emergency water use.

Keywords: Disaster awareness, Education parks, Outdoor spaces, Graduation project.

1. Introduction

Challenging environmental problems and increasing frequency of disasters cause the need for proactive and creative solutions. Therefore, cities should consider the concept of disaster-sensitive spatial open space and landscape design solutions related to the physical environment for each phase of the disaster life cycle (mitigation, preparedness, response, and recovery) to support pre-disaster and post-disaster resilience. Although spatial design is an essential component of disaster management in architectural-structural design, urban design, and landscape design, the

relationships between spatial design and disaster management are rarely discussed in the literature (Murao, 2008). In addition, the role of architects is as vital as landscape architects in landscape design solutions for disaster management since open urban public spaces and architectural structuring require creative solutions to address the multidimensional nature of disaster awareness and management.

Local disasters such as climate change, global warming, global epidemics, earthquakes, environmental pollution, soil erosion, fire, and flood occur in social life and concern the world. Effective management is needed to reduce disasters' impact in advance and save and normalize life if disasters occur. Successful leadership is possible by recognizing the disasters and raising awareness by knowing their causes, processes, precautions, and prevention training.

The research aims to reveal solutions for an exemplary disaster awareness park for Cekmekoy Istanbul. The proposed landscapes are classified concerning disaster awareness and used in the organizational plans as an emergency meeting point, and temporary disaster management center during and post disasters for disaster awareness and education in the urban environment. The research then systematically examines landscape design solutions arranging buildings and parks to increase the awareness of architecture students about disasters and reduce the impact of disasters on society and social organizations. The "Disaster Awareness-Education Center and Park will be used for local disaster management centers during and after disaster events to educate the public about urban disaster awareness and education. It will provide training on disaster prevention and the management of disaster measures to raise awareness of individuals, primarily to educate using interactive environments about global and local disasters that the society may encounter.

The following research questions formulate landscape design for architecture students' graduation projects developing architectural designs on disaster awareness-education center and park: 1) Do the students use basic landscape design principles in their projects appropriately? 2) What are the fundamental building settlement decisions regarding the use of open space and landscape needs for disaster awareness and education parks? 3) Do indoor and outdoor organization and landscape planning and design support local neighborhood disaster management for emergencies? The research hypothesizes that as part of architectural education, a proposed disaster awareness and education center and park program designed mainly in the final architectural design phase for functionality, indoor-outdoor connections enhanced with approaches based on landscape makes the design and architectural program successful and contributes to the education of the society and disaster awareness.

It is appropriate to evaluate the environment with effective evaluation criteria, choose the suitable planting approaches, and properly make the outdoor open spaces' spatial and planting designs. This hypothesis further includes measures and the role of spatial design in disaster management. Urban public landscape designs and disaster prevention management processes are essential topics interacting with disaster awareness and suggesting disaster management in architectural design. The research methodology connected the site and the roles of architects and landscape architects in the process. The research was carried out while developing the method, especially constructing the subject's background.

In an architectural design project, the architectural program and requirement of the subject should lead the layout and open space arrangement decisions at the level of landscaping along with the general requirements for disaster awareness and education center and park. In this research, student projects are evaluated by arranging disaster awareness and education indoor spaces and classifying the essential landscape planning and design criteria that established the relationship between the outdoor education and practice park.

During these evaluations, the precautions are taken to use the central structure, besides the students' disaster awareness and education opportunities defined in the architectural program, disaster impact reduction management, and basic landscape approaches discussed in the seminars. The surrounding disaster awareness park as a local disaster management coordination center, especially open spaces, may be used by the public during a disaster.

2. Background

2.1. The role of Spatial design

Urban open spaces play an active role in decision-making regarding urban health and protecting cities against external factors within urban planning and design disciplines. León and March (2014) and Hossain (2014) highlight that the planning and design of urban open spaces can play a vital role in influencing disaster risk reduction and making cities resilient. The United Nations Office for Disaster Risk Reduction (UNISDR) (2012) recommends increasing the capacity to absorb and recover from disasters through strategic planning and the design of urban open spaces. The main task of planning and design disciplines is to facilitate people's living as individuals and communities in well-being, in healthy and comfortable indoor and outdoor spaces, and in the natural, physical, and social environments formed by the buildings and buildings and open spaces where these spaces are located. A biophilic design is defined as "integration" or sometimes "manipulation" of natural elements or systems to create a sense of "life" in the built environment. Bringing biophilic design patterns into a vision for healthy homes, workplaces, and cities helps shed light on the importance of human connections with nature in our built environment and encourages people to challenge convention (Sat Gungor, 2020). In the context of this fundamental purpose of ecological approaches, disasters should be considered the main factors in the planning, programming, design, construction, and use stages of places, buildings, and spaces. It is thought to contribute to urban public spaces, especially in disaster awareness, education, and disaster reduction management.

Jayakody et al. (2016) classified "public open spaces" as follows: 1) Green spaces, including parks and gardens; 2) Natural and semi-natural green spaces, including urban woodlands, greenways, outdoor sports facilities; 3) Facility green space for children and youth playgrounds; 4) Allotments, community gardens, and urban farms; 5) Cemeteries, churchyards, and other holly open spaces. In addition, green public open spaces offer environmental benefits such as water and air purification, noise and wind filtration, and microclimatic comfort. Fuentes and Tastes (2015) highlight the importance of the link between public open spaces in cities as an integral way to plan and design cities flexibly. Urban open spaces, especially parks, meet the open and green space needs of cities and produce solutions such as reducing or eliminating the effects of flooding. Drake and Kim (2011) introduce the concept of Urban Sponge Park, which combines the concepts of stormwater engineering, urban design, and urban habitat. French et al. (2019) conducted a literature search. They found the following classification for urban open spaces used for disaster reduction purposes: multi-functionality, networks (redundancy, accessibility, scale, distribution, and grouping), site location, and suitability (risk identification). Scenario planning, site conditions), size and function, site elements (water, sanitation, food, power and lighting, wayfinding and communication), social resilience (programming, community engagement, education). This study evaluates the student projects related to disaster awareness and education park as a public open space, green open space for local users, and a local government center to reduce the impact of disaster during and after a disaster.

2.2. The relationship between the educational facility of disasters and landscape planning and design

Masuda (2014) stresses the importance of educating society with activities and exercises informing the community about the disaster functions of earthquake parks and raising awareness about disasters. French et al. (2019) highlight the significance of urban open space functionality and ensuring that its inhabitants can use its features independently, both in

daily life and in an emergency. Mazereeuw and Yarina (2017) give examples of landscape elements in park and green space design that can warn users about the instability of the land during an earthquake. Villagra-Islas and Dobbie (2014) suggest that beyond the structural features, educating local communities will foster the resilience of their environment, such as raising educational awareness on flood mitigation strategies, a better understanding of problems, preventive measures, and achievable solutions. It is suggested that the effects of earthquakes can be reduced and durability of living environment can be increased by choosing the most suitable building materials and technologies in construction, and determining the number of floors of buildings correctly, making earthquake parks ready for use (Yıldırım et al., 2021). It is essential to create infrastructure and wide-open spaces in settlements (Çelik and Erduran, 2011). Çelik and Ender (2016) suggest that indoor and outdoor areas should be made available for training programs such as "Basic Disaster Awareness Trainings" throughout the year in earthquake parks.

2.3. The role of landscape in disaster management (mitigation, preparedness, response, and recovery) cycle

Open green spaces are vital to disaster recovery situations. Generally, the importance of open space planning and design for earthquake disasters is emphasized. However, attention is drawn to the fact that topography profiles in open areas are designed for floods, droughts, landslides, extreme temperatures, fires, and biodiversity loss (URL-1). Although floods, landslides, and fire can follow earthquakes, there are no standard approaches for natural earthquakes, building collapse, or other secondary hazards such as tsunamis and liquefaction. Research on responses to earthquakes shows that the large and adaptive amount of open space surrounding buildings is invaluable both during and after an earthquake (Godschalk, 2003). Allan and Bryant (2010) explore the critical role of open space in recovery during earthquakes and analyze the successful integration of recovery planning and urban design with a consideration to the ratio of a city's total open green space, overlapping with theories of urban design, remediation planning, and urban resilience. The diversity of the city's open space structure creates a range of options that allow people in the pre-crisis community to come together, support each other and re-establish the order of their daily lives during the emergency period immediately after the earthquake (Middleton, 2007). The location of the planned open areas used after the disaster, the available data, the adoption of different methods in ensuring the accessibility of the site, the distance measure, the cumulative opportunity measure, and the benefit-based measure inform the disaster agenda (Makri and Folkesson, 1999). For various disasters, how the landscape, especially the location of the disaster awareness and education park, is defined in the disaster management cycle and how the disaster management cycle operates are discussed next.

2.4. Disaster Management Cycle

The disaster management cycle is generally divided into four interrelated phases: mitigation, preparedness (disaster-incident), response, and recovery.

1. Mitigation describes the measures taken to reduce the severity of a hazard and includes a wide range of expertise, from planning to policy, education to engineering (UNISDR, 2017; World Bank and United Nations, 2010).
2. The preparedness phase includes planning and activities that ensure effective response and recovery after a disaster (UNISDR, 2017). Studies to raise awareness, such as public education, are essential.
3. Disaster-Event The first 72 hours after a disaster is called the "power gap" before official rescue and relief teams are mobilized or reach affected communities (Halford and Nolan, 2002; Lowe and Fothergill, 2003). In most cases, neighbors are the first to arrive on the scene. Social networks play an essential role in supporting those in need, mainly on their own.

4. Response phase also deals with the provision of emergency shelter (typically overnight) and temporary accommodation (several days) (Quarantelli, 1995). When urgent response needs are addressed, priorities such as rebuilding supply chains and laying the groundwork for long-term recovery come into focus (EMBC and B.C. Department of Justice, 2015). Recovery includes activities that restore, rebuild and reduce the risk of future disasters (UNISDR, 2017).
5. While the recovery period can be seen as an opportunity for change or a chance to 'rebuild' for better solutions (World Bank and United Nations, 2010), problems created by time constraints and pressure to rebuild and return to normal can be avoided.

Figure 1: *Disaster management cycle (French, 2017).*

The different phases of the disaster management cycle and the activities in these phases are given in Table 1. While the first phase, prevention/mitigation, is related to public education, the second phase,

Table 1: *Activities of different phases of the disaster management cycle included in the disaster awareness-education center and park.*

Phases*	**Activities***	**Including disaster awareness and education center and park**
1. *Prevention/Mitigation*: Reduction or elimination of the likelihood or consequences of hazards to make them less severe and cost-effective.	● Construction of engineering structures ● Arrangement/development of building codes ● Disaster insurance systems ● Land use planning ● **Public education** ● Safety codes ● Tax, incentives, and disincentives	Public education with indoor spaces and open spaces, indoor and outdoor rehearsal places
2. *Preparedness*: Reduction of the extent or impact of disaster through planning, development of warning systems and other measures.	● **Emergency operation plans** ● **Emergency public information** ● **Resource management plans** ● **Training cadre** ● **Rehearsal of emergency response plans** ● **Stockpiling of supplies**	Local emergency disaster management operation center including stores for supplies / indoor and outdoor training areas
3. *Response*: Taking action in a few hours or days to cope with a disaster.	● Medical care ● **Distribution of essential supplies (water, food, clothing, etc.)** ● Accommodation/housing ● Infrastructure services	Stores for basic supplies
4. *Recovery*: Dealing with the aftermath and returning to 'normal' through the restoration/establishment of vital life-support systems.	● Debris clearance ● Contamination control ● Temporary housing and service restoration ● Reconstruction of permanent houses and infrastructure	

**Sources: Acar and Yalçınkaya Çalışkan (2016) Taken from Thurairajah et al. (2011). Additions are from March and Leon, (2013) and Malalgoda et al. (2010).*

preparedness, include; emergency operation plans, general emergency information, resource management plans, training cadre, rehearsal of emergency response plans, stockpiling of supplies. The third phase, response, is about distributing essential supplies (water, food, clothing, etc.). The fourth phase is related to recovery and has debris clearance, contamination control, temporary housing and service restoration, reconstruction of permanent houses and infrastructure.

2.5. The role of architects and landscape architects on prevention– mitigation- preparedness- response and recovery of disasters and its relationship with their undergraduate education programs

Architects and landscape architects are among environmental creators in the planning and designing of public spaces and urban public spaces. They are taking an essential role in the disaster management cycle in such areas and places to reduce the risks of possible disasters, in case of reducing the chances of prevention– mitigation- preparedness- response and recovery of disasters. They take a role in their education and professional life about what they can do in their phases.

What kind of roles architects and landscape architects should have, and therefore what skills, throughout the disaster management cycle is noted by Glass (2008) as architects' role as designers is exciting because of their potential to influence the properties and configuration of materials. Lloyd-Jones (2009) explains the subject in detail and comprehensively summarizes the architects' possible roles with other professionals. However, apart from such a limited number of comments, it is seen that there is a knowledge gap about the educational dimension of the disaster phenomenon and the current weaknesses of the academy in integrating the relevant strategies into design education (Acar and Yalçınkaya Çalışkan 2016). According to Cage et al. (2009), there are very few countries where architecture students have acquired the skills to design for disasters. As a result, "architects may have to 'learn' their usual approaches and relearn new ways of working to be effective," where collective problem-solving skill becomes particularly critical (Cage et al., 2009).

3. Methodology

The study's methodology is based on the classification of how students approach the disaster awareness and education park in the context of a Graduation Project, and the students use the determination of which architectural and spatial solutions. The assessment model includes two categories as functional and spatial. Within the scope of spatiality, basic spatial approaches in open areas are classified. In this classification, there are a) relationships between indoor and outdoor spaces, b) courtyard usage, c) outdoor landscape design d) relationships between outdoor spaces and surrounding areas. The scope of functionality has three sub-criteria: a) use of open space in the post-disaster environment b) multifunctional spaces c) landscape design. The spatiality parameters derived from basic biophilic design parameters (Browning et al., 2014), (Zhong et al., 2022). Criteria related to these basic parameters are defined in the booklet of the graduation project of the case study of this research paper and also the criteria used by the students which were based on the refereed literature. The functionality parameters derived from Designing Public Spaces (2018), Basova and Stefancova (2016), the criteria with the basic parameters taken from the booklet of case study graduation project and the criteria suggested by students and instructors of the according to refereed sources.

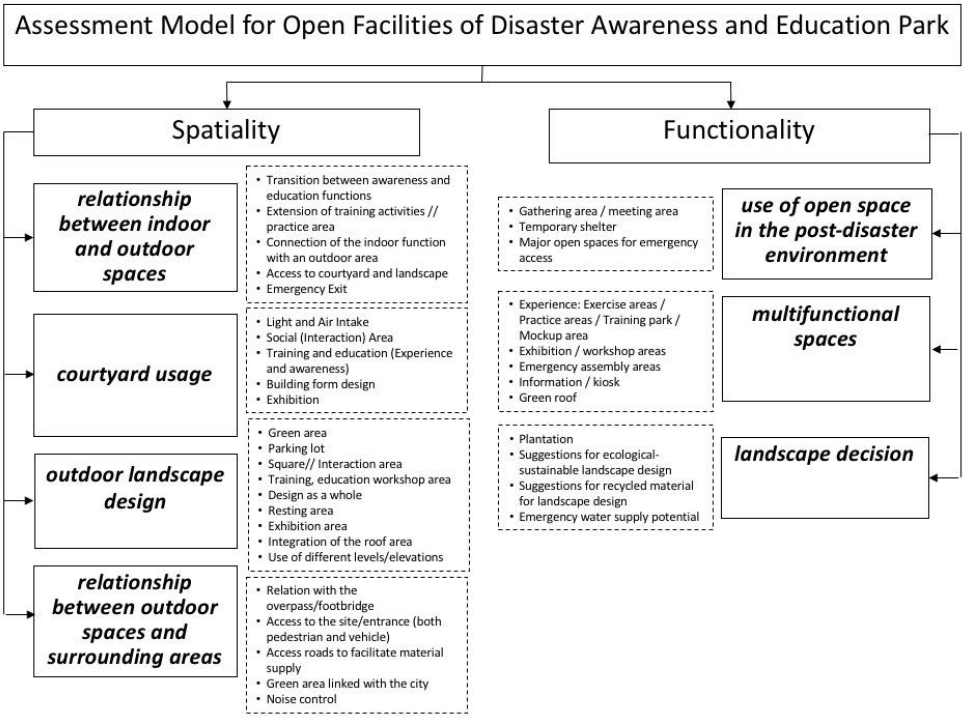

Figure 2: *Assessment model, criteria, sub-criteria and parameters.*

Within the scope of spatiality evaluations, parameters are used in four subtitles. These are the parameters that are addressed in spatial analysis in student projects, especially in open spaces, the relationship between indoor and outdoor spaces:

Relationship between indoor and outdoor spaces parameter has sub-criteria such as a) transition between awareness and education functions, b) extension of training activities/practice area, c) connection of the indoor function with an outdoor area, d) access to courtyard and landscape, e) exit organization.

- **The transition between awareness and education functions** (1) Evaluation of the transition between the program's awareness-raising and education functions.
- **Extension of training activities // practice area** (2) Providing a transition between indoor training activities and outdoor practice areas,
- **Connection of the indoor function with an outdoor area** (3) Relationships of indoor and outdoor connections of other functions
- **Access to the courtyard and landscape** (4) Access to the courtyard and use of the courtyard, the relationship with the landscape.
- **Emergency Exit** (5) Features at the exits of the spaces to open spaces to connect with the open space.

Courtyard usage the second essential parameter is the use of the courtyard. Courtyard use evaluates a) light and air intake, b) use as a social interaction interface, c) training and education (experience and awareness), d) building form design, e) outdoor exhibition.

- **Light and Air Intake** (6) Evaluation of utilizing the courtyard in terms of air and light "Utilizing the courtyard to provide sunlight and fresh air for indoor spaces."
- **Social (Interaction) Area** (7) Evaluation of the use of the courtyard as a social interaction area.
- **Training and education (Experience and awareness)** (8) Utilizing the courtyard as an open space for training,

for experience and awareness-raising activities
- **Building form design** (9) The relationship between the building form and the courtyard form, Evaluation of the design concept comprehensiveness regarding the relationship between building form and the courtyard form,
- **Exhibition** (10) Evaluation of the use of the courtyard for exhibition purposes.

Outdoor landscape design Criteria progressed for basic landscape design principles of outdoor spaces of building immediate environment.
- **Green area** (11) Organization and proportions of green areas.
- **Parking lot** (12) Evaluation of open car park spaces.
- **Square //interaction area** (13) Evaluation of square/small square interaction area in an open environment.
- **Training, education, workshop area** (14) Outdoor usage of training, education and workshop activities.
- **Design as a whole** (15) Evaluation of the joint creation of the building and outdoor spaces.
- **Resting area** (16) Evaluation of open spaces as resting areas,
- **Exhibition area** (17) Evaluation of the use of open spaces for exhibition purposes,
- **Integration of the roof area** (18) Integrating the use of open space roof garden,
- **Use of different levels/elevations** (19) Evaluation of the use of different levels in the open field.

Relationship between outdoor spaces and surrounding areas
- **Relation with the overpass/footbridge** (20) Evaluation of the communication of open areas with the surrounding area,
- **Access to the site/entrance (both pedestrian and vehicle)** (21) Pedestrian and vehicle approach/entry assessment from the environment to the land,
- **Access roads to facilitate material supply** (22) Evaluate the possibility of material distribution from warehouses,
- **Green area linked with the city** (23) Evaluation of open spaces that can establish a relationship with the city,
- **Noise control** (24) Evaluation of noise reduction measures taken in outdoor space design

Functionality

Use of Open Space in the Post-Disaster Environment Evaluation of the use of open spaces in the post-disaster period
- **Gathering area/meeting area** (25) Evaluation of meeting and aid areas with the neighborhood residents after the disaster,
- **Temporary shelter** (26) Provide an opportunity/potential to host post-disaster temporary shelters in open spaces
- **Major open spaces for emergency access** (27) Evaluation of the arrangement of open spaces for emergency access.

Multifunctional spaces Evaluation parameters of multi-purpose open spaces
- **Experience in: Exercise areas / Practice areas / Training park / Mockup area** (28) Evaluation of the multi-purpose use of experience / practice areas / training areas / mockup areas,
- **Exhibition/workshop areas** (29) Evaluation of the multi-purpose use of exhibition and workshop works,
- **Emergency assembly areas** (30) Outdoor assembly areas in case of emergency.
- **Information / kiosk** (31) Evaluation of desk / kiosk usage,
- **Green roof** (32) Evaluation of the multi-purpose use of the green roof,

Landscape decisions Evaluation parameters related to landscape design decisions
- **Plantation** (33) Evaluation of plant material suggestions,
- **Suggestions for ecological-sustainable landscape design** (34) Evaluation of ecological and sustainable landscape proposals in landscape design,
- **Suggestions for recycled material for landscape design** (35) The use of recyclable materials and technologies in landscape design and development.
- **Emergency water supply potential** (36) Water reservoirs for emergency uses.

4. The case study

Graduation Projects are private studios where students at the graduation stage in architecture

and design are evaluated to what extent they have achieved what they need for their professional life. The projects examined in this research were given in the spring term of the 2020-21 academic year, within the scope of the graduation project, which is the last of the design studios in the Department of Architecture every semester. On graduation projects, Tafahomi (2021a) wrote that this latest architectural project estimates the graduate candidate's general knowledge, skills, research, and problem-solving skills in architecture and related fields. Studies have found that students have four characteristics: knowledge, practice, presentation, and communication to develop the theoretical framework in their graduation projects (Tafahomi, 2021b). In the spring semester of the 2020-2021 academic year, the fieldwork graduation project was conducted online using technological devices under pandemic conditions. The situation, which is widespread all over the world within the scope of the COVID-19 pandemic, on the one hand, paved the way for the testing of "new" tools, methods, and experiences in teaching and learning; on the other hand, it enabled us to understand better the potentials and well-functioning aspects of "existing" pedagogical models (Yorgancioglu, 2020). Özorhon and Lekesiz (2021) identified the benefits of the remote studio with the feedback they obtained from their students as follows: 1) saving time, 2) understanding the feedback more accurately. In the same Evaluation, 1) lack of motivation, 2) difficulty in effective communication, 3) technology addiction (technological problems) were the challenging aspects of distance education. The Graduation Project, included in the case study of this article, is a disaster awareness and education center and park in Istanbul, described later in this section.

The Disaster Awareness-Education Center and Park aims to inform and raise awareness of various segments of the society with interactive exhibitions, simulations, and experience galleries about climate change and meteorological disasters, earthquakes, epidemics, soil erosion, forest fires, and environmental pollution. Disaster awareness will be located in the park by the interrelation route open and closed spaces. Visitors' interest suggests experiencing the galleries and the relevant parts of the park in an appropriate order or visiting one by one. Educational training activities such as conferences, seminars, certificates, workshops, group projects, exhibitions, and forums occur at the second part of the center. The architectural program needs of the facilities were created accordingly. The education department should engage with the different disaster awareness galleries and connected open spaces in the park. The training applications can be carried out in the open area of the park or the interactive exhibition areas. The center will have a management section, common social areas, technical areas, parking lots, and a disaster awareness-education park. The Disaster Awareness-Education Park should be planned to cover the exhibition sections and applied training areas for education and awareness in open spaces. These regions can be practice-based, especially for disaster prevention and post-disaster management training. Since the issue is related to disasters, it is essential to minimize the environmental effects, implement sustainability decisions, and highlight park features.

Disaster Awareness-Education Center and Park located on the Ümraniye-Şile highway in Taşdelen, on the new metro line that still serves as an amusement park at the southern end of the land (Figure 3) in the Cekmekoy district of Istanbul. The total size of the land is 19000 m2 (Figure 4). It was explained to the students that the relationship between the future metro station exit and the central park was expected to be handled together with all other environmental data and to be applied as hmax (maximum building height): 15.50 for the land. To make good use of the land, a limited number of above-ground cars and a maximum of two-bus parking spaces should be considered, and other parking lots should be solved underground.

Figure 3: *Map of Istanbul and location of project site.*

Figure 4: *Project site: Taşdelen – Çekmeköy - İstanbul.*

4.1. Analysis and Findings of the Case

This study assessed the spatial and functional landscape solutions for the open spaces proposed in the undergraduate architecture students' final architectural design projects. From a total of thirty-six evaluation criteria, twenty-four evaluation criteria were identified under four subtitles of the spatiality title, and twelve evaluation criteria were classified under three subtitles of the functionality title.

Students' written and graphical explanations informed these criteria. Two methods were used in the study in which a total of 16 students' projects were evaluated. The first evaluation method comprises the findings related to the criteria emphasized by the students in written and graphical expressions used in the project. The second evaluation method involves the results that were not stressed by the students in writing or graphically but were found to be met by the authors in the planning and design solutions. These are shown with separate notation in the relevant Table 3.

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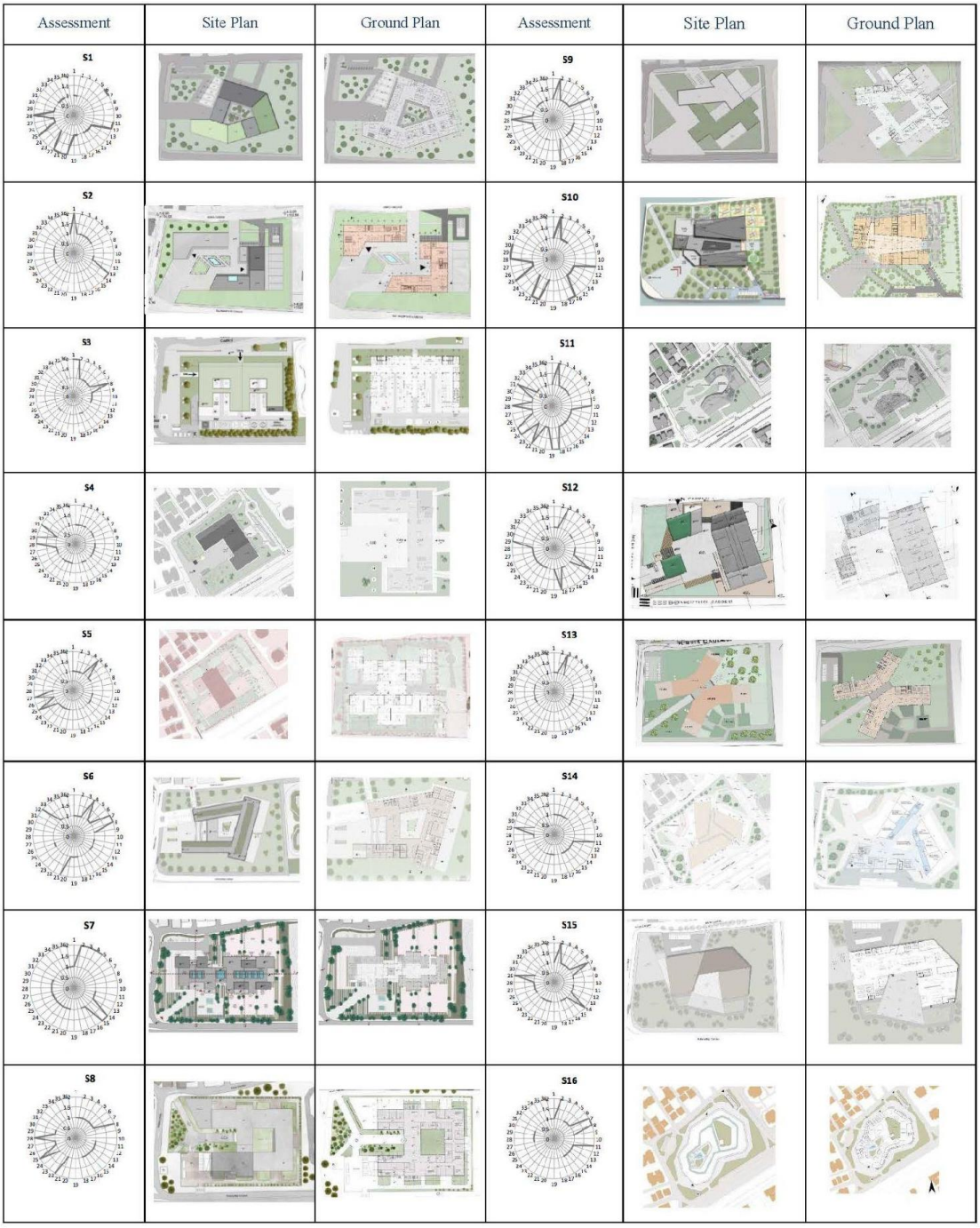
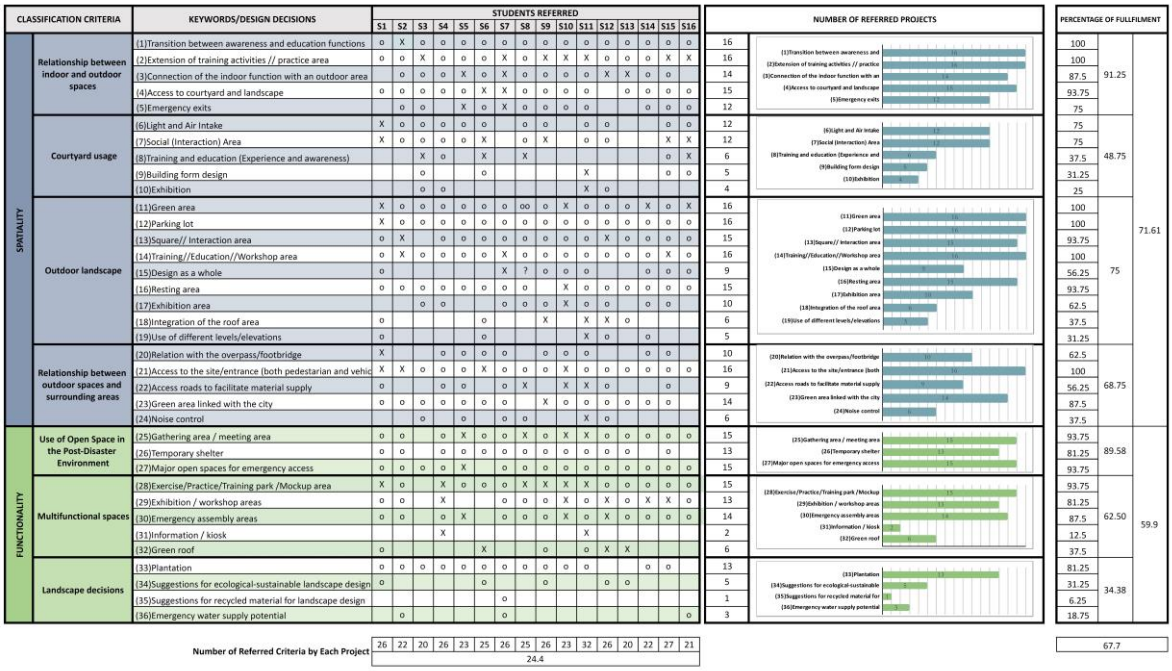
Table 2: *Student projects*



Legend of Table 2: Relationship between indoor and outdoor spaces parameter (1) The transition between awareness and education functions (2) Extension of training activities // practice area (3) Connection of the indoor function with an outdoor area (4) Access to the courtyard and landscape (5) Emergency Exit. **Courtyard usage:** (6) Light and Air (7) Intake Social (Interaction) Area (8)Training and education (Experience and awareness) (9)Building form design (10) Exhibition **Outdoor landscape design** (11) Green area (12) Parking lot (13) Square //interaction area (14) Training, education, workshop area (15) Design as a whole (16) Resting area (17) Exhibition area (18) Integration of the roof area (19) Use of different levels/elevations **Relationship between outdoor spaces and surrounding areas** (20) Relation with the overpass/footbridge (21) Access to the site/entrance (both pedestrian and vehicle) (22) Access roads to facilitate material supply (23) Green area linked with the city (24) Noise control Functionality **Use of Open Space in the Post-Disaster Environment** (25) Gathering area/meeting area (26) Temporary shelter (27) Major open spaces for emergency access , **Multifunctional spaces** (28) Experience in: Exercise areas / Practice areas / Training park / Mockup area (29) Exhibition/workshop areas (30) Emergency assembly areas, (31)Information / kiosk (32) Green roof . **Landscape decisions** (33) Plantation (34) Suggestions for ecological-sustainable landscape design (35) Suggestions for recycled material for landscape design The (36) Emergency water supply potential.

Table 3: *The assessment model.*



In Table 3, the sign "x" refers to the criteria that are both met by the design and also mentioned by the student in the project documents while the sign "o" refers to the criteria which are not indicated by the student but are evaluated by the authors as being met by the project. The assessment model has two main dimensions under classification criteria, one concerned with spatiality and the second with functionality. The evolution of the authors are given in the table with outcome graphics and success percentages.

5. Discussion

Landscape assessment of architecture student works on Disaster Awareness-Education Center and Park defined the scope of Outdoor Spaces Design Investigation on Graduation Project of Architecture Students. The methodology had two critical evaluation criteria, specified as a) spatiality b) functionality. Under these two criteria, the method suggested seven sub-criteria and thirty-six parameters. In the case study findings, all students got satisfactory results in the sub-criteria of "relationship between indoor and outdoor spaces parameter". As seen in Table 3, the "Courtyard usage" assessment on the project also gave positive results since 78.5 % of the students use courtyards. Outdoor landscape design sub-criteria resulted in 75% satisfactory with applying six parameters; the last sub-criteria under spatiality criteria was the relationship between outdoor spaces and surrounding areas. The projects were evaluated 68,75% successful under this sub-criteria.

The second criterion for assessment was functionality. The functionality criteria had three sub-criteria which were defined as "The Use of Open Spaces in the Post-Disaster Environment", "Multifunctional Spaces" and "Landscape Decisions". According to the first sub criterion, student projects were evaluated as 89,6% satisfactory. Multifunctional spaces sub-criteria resulted in 62,5% satisfactory with applying five parameters. The results of landscape decisions based on four different parameters ended with 34,4% after the assessment method had been used.

The average of the covered sub-criteria reveals that student projects met 71,6% of the spatiality criteria. At the same time, they meet 59,9% of the functionality criteria. The subcategories' overall average ratio is 67,7. When the students are assessed individually, the number of sub-criteria that each student has met varies between 20 and 32. The average number of sub-criteria met per student is 24,4 out of 36 sub-criteria. This result shows that

student projects could meet 70% of the assessment criteria on average.

6. Conclusion

Increasingly over time, it is shared that the disasters will become more critical and effective in the future due to climatic, ecological, political, and economic crises. Although education is seen as a proactive and long-term strategy for building resilience at all levels, many professionals demonstrate the importance of disaster management, and designing an environment to overcome disasters that are not recognized as an integral part of the disaster management cycle. In general, designers can take a more active role in the process of raising awareness of society about disasters and increasing their capacity to respond to disasters through sustainable and socially/culturally sensitive design solutions. This study aims to identify a few issues that should be emphasized in educational processes to achieve this goal. When the research results are evaluated with the methodology applied, it is seen that successful results have been obtained in the connection of indoor spaces with open spaces, their multi-purpose use, and the integration of indoor-outdoor spaces. However, it has been determined that they are not equally successful in making sustainable ecological landscape decisions and using renewable resources in open areas. To make life easier in the future, the need for more studies on disasters in design studios emerges, together with an intellectual familiarity with society's problems about disasters.

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