AN INVESTIGATION OF THE EFFECTS OF COVID-19 ON PUBLIC SPACE DESIGN PRINCIPLES IN THE CASES OF BEŞIKTAŞ, KADIKÖY, AND ÜSKÜDAR ISTANBUL

Una investigación de los efectos del COVID-19 en los principios del diseño del espacio público en los casos de las plazas Beşiktaş, Kadiköy y Üsküdar en Estambul

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ABSTRACT
The COVID-19 epidemic changed our lifestyles. In this study, we examine examples of public space design principles that reflect current lifestyles in the ongoing pandemic and investigate the effects on design principles before and after the pandemic. Through fieldwork, on-site detection, observation, and photography, a study was conducted regarding design principles defined by Hartleben (2020). The research team studied 'polyfunctionality', 'loose fit', 'redundancy', 'access at all levels', 'modularity', and 'signaling', in three squares of Istanbul. These principles are multi-dimensional and key to maximizing the successful adaptation of the public space to unexpected conditions. The results show that the principles of 'polyfunctionality' followed by 'redundancy' are those most affected by the social distance and hygiene policies during the pandemic. This study suggests that social distance adequacy and the presence of hygiene should be considered in the existing design principles.

KEYWORDS
COVID-19 Pandemic; urban square design; Public Realm; İstanbul; Social Distance

RESUMEN
El proceso pandémico provocado por la epidemia del COVID-19, que afectó a todo el mundo y se propagó rápidamente, ha provocado que nuestros estilos de vida social cambien. En este estudio, se pretende examinar aplicaciones creadas con estilos de uso actuales, considerando los principios del diseño de espacios públicos que se han modificado por efecto de la pandemia en curso, así como investigar los efectos en los principios de diseño antes y después de esta. En este contexto, se realizó un trabajo de campo, detección in situ y un estudio de observación y fotografía con respecto a los principios definidos por Hartleben (2020), a saber: polifuncionalidad, ajuste holgado, redundancia, acceso en todos los niveles, modularidad, señalización, para garantizar que el acceso a tres plazas importantes en Estambul sea multidimensional, al tiempo que maximice la adaptación exitosa del espacio público a condiciones inesperadas. Como resultado de dicha investigación, los principios de polifuncionalidad seguidos de los de redundancia son los más afectados por los conceptos de distanciamiento social e higiene que ha dejado la pandemia. También se enfatizó en que los asuntos de adecuación de la distancia social y presencia del concepto de higiene deben agregarse a los principios existentes.

PALABRAS CLAVE
pandemia, diseño cuadrado, ámbito público, Estambul, distancia social

Figure 1
Polyfunctionality in public spaces

Note Up: Domino Park, New York, Cogley, 2020. Down: Fiberglass seating places, C'entro, 2020.

Introduction

This study analyzes the effects on public space design principles created by the new forms of living under COVID-19 restrictions. The COVID-19 crisis has highlighted various gaps in the public realm, including accessibility, resilience, design, management and maintenance, connectivity, and fair distribution across a metropolitan area (Afrin et al., 2021). While stressing the need to impose social distancing measures to limit the spread of COVID-19, loneliness has brought about problems of anxiety and depression, especially among people living in dense urban environments with limited public space (Costamagna et al., 2019; Samuelsson et al., 2020). Ensuring the safe use of open and green spaces is a challenge in controlling the transmission of Covid-19 in the external environment (Eltarabily, & Elghezanwy, 2020; Freeman, & Eykelbosh, 2020; Rojas-Rueda et al., 2019). The research team studied the six key factors identified by Oliver Hartleben: 'polyfunctionality', 'loose fit', 'redundancy', 'access at all levels', 'modularity', and 'signaling'; and its influence in ensuring that access to the space is kept multi-dimensional and can maximize the successful adaptation of the public space to unexpected conditions (Brandon, 2020; Hartleben, 2020).

Polyfunctionality

The public space needs to be designed for sequential or simultaneous multiple uses, including uses that will not be required after the pandemic or are still non-extant (Brandon, 2020; Van Melik, & Filion, 2021). Urban open spaces are essential in terms of spatial organization, as people spend more time carrying out various activities in them (Fleury-Bahi et al., 2017; Gaol et al., 2014).
Sepe (2021) stated that many other activities that can't be carried indoors could be held in open spaces due to the lack of appropriate physical distance. As a proposed procedure to reduce the spread of the COVID-19, the waterfront park situated in Brooklyn's Williamsburg precinct was one of the first parks in the city to design a path to impose social distancing of 1.8 m, white circles were used to maintain social distance at Domino Park (see Figure 1), located in New York (Gill et al., 2020).
It was essential to maintain physical activity at home or in allowed safe, natural environments (e.g., urban forests) during the quarantine period (Chen et al., 2020). It is recommended to exercise at home during the lockdown and at other times at accessible neighborhood parks (Kaur et al., 2020; Peçanha et al., 2020; Slater et al., 2020).

Long-term lockdowns have increased the need and demand for nearby public spaces. Gehl suggested that people can socialize mainly by using the streets, sidewalks, and parks in their communities (O' Connor, 2020. Total or partial restriction of vehicular access to the roads has been one of the measures imposed during the pandemic (Aloi et al., 2020; Collivignarelli et al., 2020;

Figure 2
Rathausplatz

Note Up: Before the pandemic, Heute (2020) Down: After the pandemic, Rathausplatz Film Festival (Vienna), by Sabine Hertel, Heute (2020).

Dantas et al., 2020). The goal is to keep people as far from each other as possible. In this respect, the number of people according to the capacities of public spaces was determined, whereas supervised user entries and exits were carried out. Many cultural activities affected by the pandemic (Kern, 2020; Martins, & Shule, 2020) were realized by reducing seating capacity. An example of this is the annual music and film festival held at Vienna's Rathausplatz; while the number of art lovers participating in this festival was 5200 in 2019, this number dropped to 500 after the pandemic set in (Figure 2) (Varol, & Öksüz, 2021).

Many adaptations of public spaces to reduce the transmission of COVID-19 have been identified, such as faucets, handwashing stations, disinfectant dispensers, temperature control technologies, and automatic toilets (Figure 3). Social distancing areas are a safe ground for physical activities and learning experiences such as story hours, street games, and obstacle courses (Lipovsky 2021). Street Lab's PLAY NYC program has launched a program to promote safe, hands-free play for kids in neighborhoods where it's needed (StreetLab, 2020). The Udaipur Municipality in India has built a safe environment for health workers and children walking to school.

In response to COVID-19, many cities have recorded significant increases in cycling and walking (Combs, & Pardo, 2021; Jobe, & Griffin, 2021; Venter et al., 2020). Brasilia only allowed pedestrians and cyclists on the streets on Sundays. Madison has added new bike lanes using standing bumpers and closure signs mounted on traffic barricades for active resting while maintaining physical distance between users. A comfortable street for bicycles was created in Sigulda with temporary pavement extension, and the speed of cars was reduced. Milan developed 35 km of new pedestrian and bicycle infrastructure; a 4-5 km corridor along the city's busiest metro line was marked so that the sidewalks have been widened, and the bike paths are protected (Figure 4).

Loose Fit

A park or a sidewalk, every public space should be of the size deemed necessary to adapt to changing and evolving requirements flexibly. That said, oversizing should be carefully considered. To avoid impersonal spaces, they need to be designed to "work for one or 10.000 people," as Jan Gehl puts it (Brandon, 2020). As for social distance, the matter of widening sidewalks on main streets and avenues where there are compulsory works/services, public transportation hubs, or along routes with heavy pedestrian traffic has begun to be implemented with painted crosswalks and medians marked with flexible pylons, thus creating safer conditions for pedestrians. Sidewalks are continuous, not interrupted abruptly or at road crossings, thus facilitating ample space for pedestrians to move, sit, shop, eat, meet, and socialize (Luke, 2020). Pedestrian-only streets

Figure 3
Portable sinks and sanitizers

Note Up: Kigali, Ruanda (Agencies, 2020); Down: São Caetano, Brazil. (Nacto and Global Designing, 2020, p. 19).

and avenues not only increase overall safety for walkers but can also reduce noise levels while improving local air quality, property values, store sales, and overall health. Pedestrian-only streets should be strategically placed and easily accessible from residential and commercial areas. They must be well linked to public transport systems, bike paths, parking, and other access points. Through pylons, Oakland has helped people access essential services such as convenience stores, food distribution centers, and coronavirus testing sites, which increase pedestrian visibility at crosswalks. Street art, furniture, and green infrastructure have also been added here to create a more defined and inviting pedestrian space.

Even though measures such as social distancing, face masks, and disinfecting public transportation were issued during the COVID-19 pandemic, public transportation was less preferred than before the outbreak. Moreover, as for public transportation use, data shows that private car ownership and the distance between home and work prefer alternative routes instead of public transportation (Erbaş, 2020). Temporary pedestrianization activities, the closing of some roads, and increasing the number of bicycle paths were some changes during the pandemic. Such changes have led to micro-mobility measures (Gutiérrez, 2020). Due to these changes and transformations in the streets, "Slow Ahead" signs have been placed on the street ground (Varol, & Öksüz, 2020). Post-pandemic domestic spaces have ceased to be a place where only shelter and basic life needs are met and have become the only place where people work, practice sports, and socialize, especially when countries have decided to close for a long time (Cetin, & Karafaki, 2021).

Redundancy

Redundancy requires access, roaming, and servicing from multiple locations. The ability to respond quickly to changing conditions is limited. Roads can be shared to limit circulation and the extra cost of doubling services, and services should be designed to be clustered only in strategic locations, for example, where roads intersect or where there are clear zone boundaries (Brandon, 2020). Public transport stops are made up of sidewalks too busy or too narrow to wait in physical distance. Ramps, pedestrian crossings, and security islands were created to access the stops. London determined a certain area on the main street so that all access can be provided, and services can be provided only in those areas (Ducharme, 2021). In focusing on increasing physical distance and hindering concentrated human contact, as a priority, the furniture that restricts the use of space in the waiting areas should be reduced and clean spaces should be left. In contrast, the necessary social distance should be maintained by using dividing elements between seating ensembles (Güvlü, & Yılmaz, 2021).

Figure 4
Milan's Strade Aperte Plan

Note Future Lab, 2020.

Routines that minimize direct contact with others in people's daily lives, such as avoiding crowded gathering places and common greetings, maintaining a distance of at least two meters, and avoiding contact with high-risk people are emphasized by many designers (Shawket, 2020). Considering that concepts such as 'social distance' and 'personal isolation' will shape social life for the foreseeable future after the epidemic process, it can be predicted that a new design approach requiring re-evaluation of the number of users/ usage area ratios will become widespread in the field of architecture, whereby some stereotypes will change (Ensarioğlu, 2020). In the park project developed by Precht Architecture Office after the Covid-19 crisis broke out, design decisions were introduced that ensure users maintain proper social distance. Partitioned from each other by plant walls resembling fingerprints, walkways allow users to be outdoors while maintaining social distance. Considering the lack of contact with nature in urban area designs in general, this labyrinth-shaped system which allows people to intertwine with outdoor nature, was designed (Ravenscroft, 2020).

Access at all levels

Access requires universal accessibility principles and give access for many types of vehicles, as special circumstances require (Francis, 2003; Nasar, & Evans-Cowley, 2007). The venue needs to offer multiple paths, convenient circulation and, if needed, partition off user flows (Brandon, 2020.)

It's important to minimize the volume and speed of traffic, and to ensure people can safely walk, cycle, run and use public transport comfortably (Mwebesa et al., 2021; Pucher, & Buehler, 2010). Since the start of the pandemic, they have implemented city-wide, neighborhood-scale or corridor speed limit reductions based on the extent different users and movements interact on the street. In Sigulda, a convenient bike street was created, and their speed was lowered through temporary pavement extensions. In Brussels, a 20 km/h (12 mph) zone in the city center has been allocated for pedestrians to walk safely along the road (Nacto and Global Designing, 2020). In New York's subway, there has been a precipitous 90% drop in passenger numbers (Teixeira, & Lopes, 2020).

Fewer cars and lower speeds, leads to the possibility of safely walking the streets, riding bikes, or performing various social activities. In addition, effects such as the rise in the use of private vehicles instead of mass transit and the expansion of bike lanes have emerged (Gutiérrez, et al., 2020).

Vacant spaces between parks, apartments and streets are intermediate spaces and are situated within the community texture. In this regard, there is diverse and variable use, especially within the context of the neighborhood makeup. It shows that using

Figure 5
Social distancing in public spaces

Note Up: Vilnius-Lithuania. (Go Vilnius, Nacto, & Global Designing Cities Initiative, 2020, p. 38). Down: Maryland-USA (Dinç, 2020, p. 32).

intermediate venues creates an alternative to the lack of outdoor public spaces in the neighborhood (Gök, & Erman, 2021; Jasiński, 2020). Because the risk of contamination is minimal, people prefer streets or intermediate spaces as open spaces. Iconic parks, streets, squares and common areas at different points in the neighborhood are often used for shows and gatherings. Along with the epidemic, these gaps are being turned into socializing areas (Jasiński, 2020).

Senior citizens have been left in a vulnerable position. Individuals aged 65 and over represent most deaths compared to the other age groups. Staying at home for a long time due to curfews applied according to chronic age has also altered the inter-generational interaction processes (Varışlı, & Güntekin, 2020). Therefore, care should be taken while designing spaces and furnishings to ensure that they are suitable for individuals of all ages' use and physical abilities (Story et al., 1998). Suitability for function; necessitating usability and operability in epidemic conditions (Ellin, 1999; Gök, & Erman, 2021; These are studies aimed at meeting outdoor and green space needs of the city, which allows people in public space to be intertwined with nature while maintaining social distance during the epidemic (Ravenscroft, 2020). In England, the public is directed to open areas for activities to be conducted individually or in groups, and activities to be carried out collectively are limited to six people. In the Netherlands, a previously closed-off area in an outdoor square was opened and transformed into an activity venue (Dönmez, 2020).

Modularity

Public space must be modular to be easily divided or enclosed, especially in public safety situations. Modularity is also important to allow space to change dynamically. For instance, considering health concerns and public attitudes or preferences can be heard much more in outdoor dining areas (Brandon, 2020). Eighteen public spaces in Vilnius, including Cathedral Square, were opened for outdoor cafes and restaurants to ensure the safe operation of workplaces. The goal is to ensure that tables are far from each other according to public health rules and maintain barrier-free space for pedestrian movement. In Milan, parking lots were converted into outdoor dining areas. Specially designed for a restaurant in Maryland, dining tables reminiscent of inflatable boats created a distance of approximately two meters between customers, facilitating the social distance rule (Figure 5) (Dinç, 2020). Instead of building them in large capacities, the post-pandemic period may result in the design of more common areas such as wet areas, dining areas, and rest areas with diminished capacities. This arrangement is also bound to reduce in-building mobility (Sipahi, 2020).

Created by Lmnts Outdoor Studio, a project has installed 50 custom clear, frameless, geodesic domes in open spaces in Toronto. It aims to safely bring yoga and fitness exercises to the outdoor environment

Figure 6
Toronto, Canada

Note Harrouk (2020).

by following social distance rules (Figure 6) (Harrouk, 2020). TULIP by ADHOC architects adds a social component to an existing park in the city, allowing citizens to reclaim urban space while complying with sanitation norms. Similarly, proposed by HUA HUA Architects, the Gastro Safe Zone program aims to help gastronomy businesses by arranging dining areas following social distance (Cutieru, 2020). The pandemic has brought about many changes and transformations in community by impacting the living spaces, work environments, human relations, shopping and activities (Gök, & Erman, 2021). Seattle has initiated a program to transform parking lots near food facilities into pickup and loading areas for customers and delivery workers. Broadway Street in Chicago has been converted into a pedestrian communal through the use of parking lanes as outdoor seating for restaurants (Nacto, & Global Designing, 2020). Conducting mass events has begun to be applied in streets with fewer residences, narrow roads or streets with more pedestrian use, multi-lane streets with low vehicle volume, parking lots and outdoor areas. Moslems in the Adjame region participate in worship to celebrate the end of Ramadan. In a series of drive-in concerts that began in Denmark, over 2.000 people in 600 cars gathered at the Copenhagen Airport to listen to live music under pandemic conditions ("Corona" sonrası dünyada canlı müzik deneyimi: Arabalı konserler, 2020).

Signaling

The different areas and elements of any public space should be easily identified by the community and authorities (Figure 7). While technology can certainly inform users about distance and usage in space, intuitive handling of spaces or sectors with simple design tools such as paint, patterns and materials should not be underestimated (Brandon, 2020). People feel comfortable and safe when using areas where we sense we can be seen and heard by others, where there are clear fields of view, legibility, and effective lighting. In view of this situation, a design approach is an important tool in improving everyone's sense of well-being and making spaces more user-friendly, easy to understand and safe (Yeang, 2000). Traffic control barriers such as traffic pylons, free-standing bumpers, traffic pontoons, mobile gate barriers (metal barriers), small flowerpots and fence barriers will be effective for separating vehicle and pedestrian paths. Heavy separators are positioned at critical points where the lane is closed to access on streets with heavy vehicle volume. The Pasadena Department of Transportation has placed soothing traffic signs along the city's main roads to remind drivers of street users walking, running, and cycling. Brookline has installed cones and pedestal bumper-mounted beacons along four high-volume streets to widen sidewalks and create bike lanes.

To facilitate said application, the points where separators will be placed are marked with spray paint or spray chalk. In Miami, appropriate distances for social distancing are marked at public

Figure 7
Signaling examples

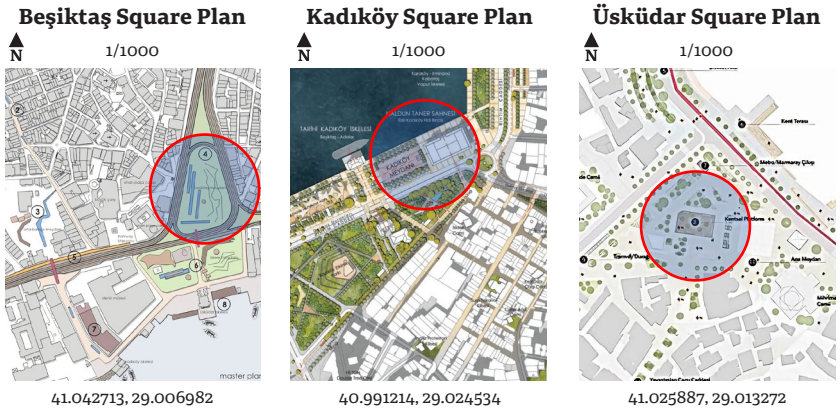
Note Up: Kalaw-Myanmar (Jain Weraphong, Nacto, & Global Designing Cities Initiative, 2020, p. 40). Down: Wuhan-China, CGTNOfficial (Nacto, & Global Designing, 2020, p. 43).

transit stations. In Kalaw, vendors in the marketplace use paint to mark their stalls, ensuring that customers shop safely. In Wuhan, high-school students line up to enter their school by following signs on the floor and having their body temperature measured at the entrance. By using quickly placed materials such as paint, barriers, flowerpots, cones or bumpers, design speeds are reduced with strategies to smooth vehicular traffic. Studies show that viruses have different lifespans on different surfaces. As such, a recent study published in the New England Journal of Medicine reported that the virus could survive for 72 hours on plastics, 48 hours on stainless steel, 24 hours on cardboard, and up to 4 hours on copper. Considering this information, materials to be used in the public domain are important. In addition to producing self-cleaning surfaces that viruses and bacteria cannot adhere to, with different technological developments, positive aspects of some traditional materials are also on the agenda (Sipahi, 2020).

Method

These determined criteria were examined in three different areas, Beşiktaş Square, Kadıköy Square and Üsküdar Square (Figure 8), with the method of on-site detection and observation photography. Since the effect of the pandemic is better analyzed in crowded areas, these three main squares were preferred as a field study. The study of Hartleben's design criteria of the post-pandemic effects required a study of the cases before and after the pandemic restrictions changed the city. These changes and how it would affect the arrangements to be made in urban spaces in the subsequent post-pandemic era were investigated. The area of study is indicated in red in Figure 8.

Figure 8
Research area



41.042713, 29.006982 40.991214, 29.024534 41.025887, 29.013272

Note Based on Google Maps data.

Research Findings
Effects of the pandemic on urban design principles

Table 1
Polyfunctionality analyzes

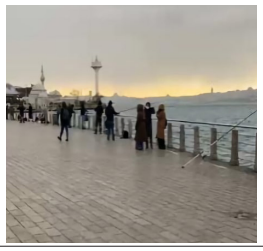
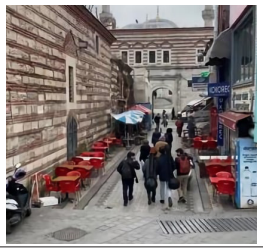
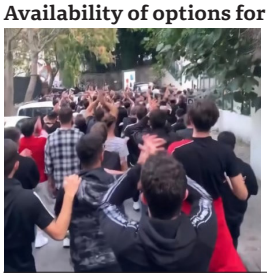
Beşiktaş	Kadiköy	Üsküdar	Analyses
The photographs obtained during fieldwork belong to the authors. The fieldwork was carried out on January 19, 2022.			
Conducting different activities				It was observed that there were different activities in all three squares.
Time (space usage times)	The three squares are utilized throughout the day.			
Usage diversity				It was identified that transition points between the buildings in the areas were used actively during the pandemic. Other areas unused previously were also activated.
Availability of options for activities to do				Options for events to be held in Beşiktaş and Kadıköy Squares prior to and after the pandemic were observed.
Availability of public WCs				No public WC in any of the three squares were observed.
Possibility of playing n the street				No street areas for playing in any of the three squares were observed.
Availability of bike lanes				Bicycle lanes are found in all three squares.

Table 2
Flexibility analyses

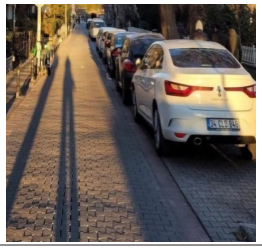
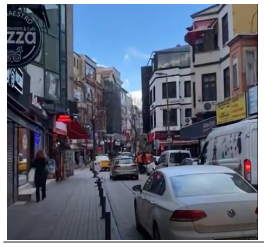
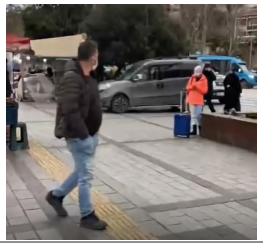
Beşiktaş	Kadiköy	Üsküdar	Analyses
Works to expand sidewalks			
			Only Beşiktaş Square presents expanded sidewalks.
Presence of safe crosswalks			
			Safe pedestrian crossings are present in all three squares.
Availability of options for activities to do			
			It was determined the use of private cars in Kadıköy Square exceeds that of mass transit.
Vehicles dominate pedestrian use in the area			
			The use of cars has increased in all three squares. It was observed that cars, rather than pedestrians, are prevalent in the squares.
Utilizing all parts of the space			
			It was determined that along with the impact of the pandemic, most of the space has begun to be used in all three squares.

Table 3
Applicability analyses

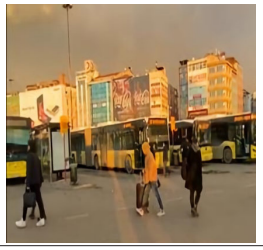
Beşiktaş	Kadiköy	Üsküdar	Analyses
Adequacy of public transport stops			
			Public transportation stops are sufficient in Beşiktaş and Kadıköy Squares, but insufficient in Üsküdar Square.
Presence of waiting areas			
			There are waiting areas in all three squares.
Presence of social distancing safe areas			
			While Kadıköy Square features safe 'social distance' areas, it has also been observed there are no 'social distance' safe areas in Beşiktaş and Üsküdar Squares.

Table 4
Access at all levels

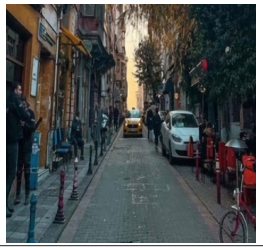
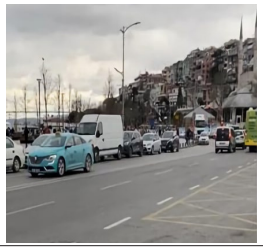
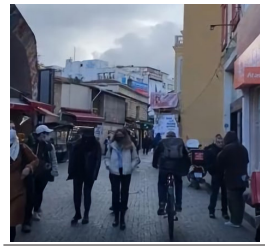
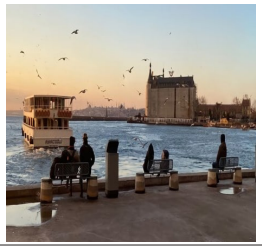
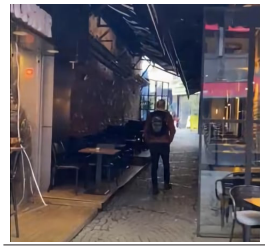
Beşiktaş	Kadiköy	Üsküdar	Analyses
Reduced speed streets			
			There is reduced speed streets in Beşiktaş and Kadıköy Squares, with no such streets in Üsküdar Square.
Ability of people to use various transportation options in the vicinity			
			Different modes of transportation exist in all three squares before and after the pandemic.
Use of the field by people (not vacant)			
			It was observed that although the areas are used less due to the restrictions imposed in all three areas, the outdoor seating areas have not been removed.
Usage by people of various age groups			It has been observed there are users of different age groups in all three squares.
Making the area functional for users			
			Beşiktaş and Kadıköy Squares have seating areas. On the other hand, repair and maintenance materials for bikes used as a means of transportation in Üsküdar Square also contribute to the functionality of the spaces.

Table 5
Modularity

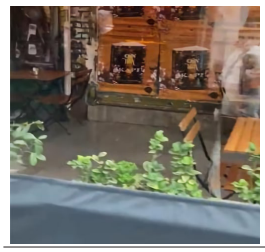
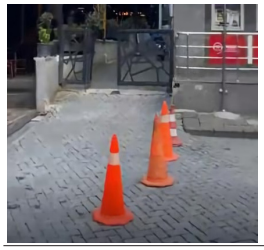
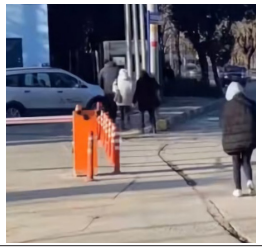
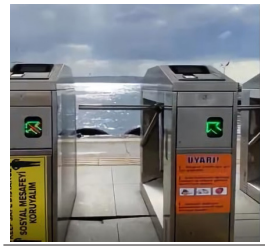
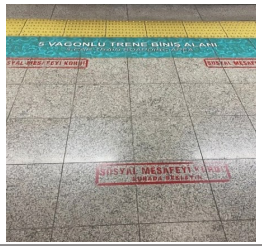
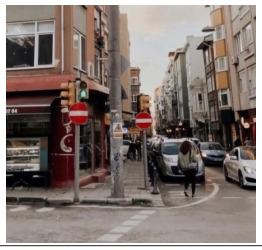
Beşiktaş	Kadıköy	Üsküdar	Analyses
Availability of outdoor dining areas			
			The number of outdoor eating areas increased after the pandemic in all three areas.
The possibility of enlarging Or reducing the area			
			Existing areas in Beşiktaş and Kadıköy Squares have been enlarged. No enlargement or reduction has been observed in Üsküdar Square.
The possibility of dividing the area			
			The areas are divided in Beşiktaş and Kadıköy Squares.
Conversion of spaces into common spaces			
			Outdoor spaces were transformed into public areas in Kadıköy Square, with no such transformation in the other areas.
Making collective events			
			Sports events in Kadıköy Square and concerts in Beşiktaş Square have begun to be held. No such events have been held in Üsküdar Square.

Table 6
Signaling

Beşiktaş	Kadıköy	Üsküdar	Analyses
Remote visibility of the area, perception of the inside from the outside			
			While separator materials are used to identify the post-pandemic areas from afar in Kadıköy and Beşiktaş Square, no such elements are incorporated in Üsküdar Square.
The presence of separator elements			
			Separator elements were observed in the post-pandemic areas.
Presence of markings			
			An increase in markings in the post-pandemic areas has been observed in all three areas.
Adequacy of the materials used			
			The use of signaling materials in the areas during the pandemic has been insufficient.

A comparison of Beşiktaş, Kadıköy, and Üsküdar Squares before and after the pandemic

All parameters of the 'redundancy' and 'signaling' principles have changed in a flexible manner after the pandemic. Regarding the principle of 'Polyfunctionality,' while the parameters of realization of different activities, usage diversity, availability of options for activities to be done, availability of playing in street areas have not changed after the pandemic, those of Time, the availability of public WCs, and the availability of bike lanes have since changed. While the parameters for the principle of 'access at all levels,' such as people using various transportation options in the area and

the use of people in various age groups have not changed after the pandemic, those of reduced speed streets and the area's functionality for users have varied. With the 'modularity', while the parameter of the availability of open-air eating areas did not change after the pandemic, those of the possibility of enlarging or reducing the area, the possibility of dividing the area, the use of people of various age groups, as well as the possibility of collective activities changed.

TABLE 7
A comparative assessment of three squares before and after the pandemic

	Factors	Beşiktaş Square	Kadıköy Square	Üsküdar Square	Beşiktaş Square	Kadıköy Square	Üsküdar Square
		Before the pandemic			After the pandemic		
POLYFUNCTIONALITY	***Presence of different activities***						
	Yes						
	Averange						
	No						
	Time						
	24 / 7						
	Morning & Night						
	Only Afternoon						
	Diversity of usage						
	Yes						
	No						
	Availability of options for activities to do						
	Yes						
	Averange						
	No						
	Availability of public WC						
	Yes						
	No						
	Availability of playing in street spaces						
	Yes						
	No						
	Availability of bike lane						
	Yes						
	No						

Table 7
A comparative assessment of three squares before and after the pandemic

	Factors	Beşiktaş Square	Kadıköy Square	Üsküdar Square	Beşiktaş Square	Kadıköy Square	Üsküdar Square
		Before the pandemic			After the pandemic		
FLEXİBİLİTY ANALYSES	***Sidewalk widening***						
	Yes						
	No						
	Availability of safe crosswalks						
	Yes						
	Averange						
	No						
	The use of private cars exceeds that of public transport						
	Yes						
	Averange						
	No						
	Vehicles dominate the use of pedestrians in the area, hindering them from easily accessing the area						
	Yes						
	Averange						
	No						
	Availability of all sections of the space						
	Yes						
	No						
REDUNDANCY	***Adequacy of public transport stops***						
	Yes						
	Averange						
	No						
	Availability of waiting areas						
	Yes						
	Averange						
	No						
	Presence of social distancing safe space						
	Yes						
	Averange						
	No						

TABLE 7
A comparative assessment of three squares before and after the pandemic

	Factors	Beşiktaş Square	Kadıköy Square	Üsküdar Square	Beşiktaş Square	Kadıköy Square	Üsküdar Square
		Before the pandemic			After the pandemic		
ACCESS AT ALL LEVELS	***Reduced speed streets***						
	Yes						
	Averange						
	No						
	Ability of people to use various transportation options in the area (such as busses, bikes, cars)						
	Yes						
	No						
	People using the area (not vacant)						
	Yes						
	Averange						
	No						
	Use by people of various age groups						
	Yes						
	No						
	Rendering the area functional for users						
	Yes						
	Averange						
	No						
MODULARITY	***Availability of outdoor dining areas***						
	Yes						
	No						
	The possibility of enlarging or reducing the area						
	Yes						
	No						
	The possibility of dividing the area						
	Yes						
	No						
	Transforming spaces into common spaces						
	Yes						
	Averange						
	No						
	Organizing collective events						
	Yes						
	Averange						
	No						

Table 7
A comparative assessment of three squares before and after the pandemic

SIGNALING

Factors	Beşiktaş Square	Kadıköy Square	Üsküdar Square	Beşiktaş Square	Kadıköy Square	Üsküdar Square
	Before the pandemic			After the pandemic		
Viewing the area from a distance, viewing the inside from the outside						
Yes				■	■	
Averange	■	■	■			
No						■
The presence of separator elements						
Yes				■	■	
Averange	■	■	■			■
No						
Presence of markings						
Yes				■	■	■
Averange	■	■	■			
No						
Adequacy of the materials used						
Sufficient						
Average	■	■				
Insufficient			■	■	■	■

Discussion

The principle of 'polyfunctionality' was the most affected by the social distance and hygiene measures during the pandemic. With the pandemic's impact on the new normalization process, the use of urban space and activities in it have changed. In line with the information obtained from the on-site work conducted, it has been seen that the three squares are actively used when there are no lockdown restrictions imposed. As is understood from work carried out around the world, 'polyfunctionality' depends of public WCs in urban areas, and in this study, it was observed that said applications have yet to be introduced at these three main squares. Such adaptations of the public space found abroad need to be universalized, because, this field study shows there remains much work to be done in this regard. The presence of bike lanes and the possibility to play in the streets need to be increased as well. In other words, design proposals implemented in other countries should be made available in everywhere.

People have exhibited a preference to use their private vehicles rather than public transportation, as a precaution, resulting in an increase in traffic. Both vehicular and pedestrian routes have changed. Since the vehicle density is high, the movement area of pedestrians has been restricted. As a solution, roads have begun to be widened. Although examples of roads in areas where similar field studies were conducted around the world seem to be well-designed, this application is considered inadequate for changes of the 'redundancy' principle in the post-pandemic era. In our study, we only identified the sidewalk widening in Beşiktaş Square. While it allowed pedestrians to proceed with more distance between each other, this caused a narrowed flow of vehicular traffic along the thoroughfares. As was noted in the field study, this principle was deemed insufficient. These roads and sidewalks should be widened as much as possible so as not to hinder traffic flow, whereas all parts of the area need to be made usable.

The principle of redundancy has mostly affected public transport stops and waiting areas with variable intensity of use. In the field work conducted, it was observed that public transportation stops and waiting areas were insufficient, and social distance areas had just begun to be introduced. Nonetheless, designs created intertwined with nature that were introduced around the world after the pandemic were not encountered in this field study. Amongst the study areas, the increased waiting area was only encountered in Kadıköy Square. This practice has allowed people to wait more socially distanced from each other. Public transportation stops and waiting areas should be increased in the post-pandemic era, whereby the security of these areas should be designed and implemented with social distance in mind.

As for the 'access at all levels' principle, projects to reduce car speeds, functionality in the use of space, and transportation diversity were analyzed. Teixeira and Lopes (2020) noticed that the percentage of passengers preferring the New York subway had dropped. The use of public transportation had decreased, and the use of bicycles had increased. While it shows that the use of various transportation modes has continued after the pandemic, there has been a Noteble rise in private vehicle and bike usage. Reduced speed street designs were also incorporated in Istanbul's Kadıköy and Beşiktaş Squares. While reducing the speed of vehicles to make it easier for people to access, the modifications also increased the use of private vehicles. The pandemic has reduced functional efficiency in some areas. Urban furniture designs were introduced in Kadıköy Square, which in turn has boosted its functionality. Taking all the information in account, bike lanes need be expanded, more urban furniture is also needed, as well as reduced speed street designs.

The principle of 'modularity' has influenced space transformations and dimensions. Outdoor designs seen in various countries were studied regarding social distance. Nevertheless, according to analyses compiled in this field study, this characteristic is insufficient in Turkey. While the designs have implemented larger areas for Beşiktaş and Kadıköy Squares, the divisibility of the areas has also been increased. Nonetheless, this divisibility has had a negative impact upon pedestrian and vehicle circulation. Open spaces of Kadıköy Square have been transformed into a common activity area. This application has led to an increase in space transformation. As a result, knowing that public events can be organized in the squares in question, the areas need to be split up to keep social distance in mind.

Signaling materials have been an important criterion in the design to ensure viewing of the areas from afar during the pandemic process. The implementation of this principle has risen both worldwide and in Turkey during the post-pandemic era. In the working area of Kadıköy Square, statues were erected so that the area could be seen from afar, whereas masks were affixed to the statues. Thus, the importance of the pandemic has been underscored. Public area markings have been changed and increased with the effect of the pandemic. This has made it mandatory for people to comply with the social distance rule. As was observed, there has been a considerable increase in the use of separating elements. More markings and separating elements should be used to improve visibility.

Conclusion

Considered a full-blown pandemic, the COVID-19 epidemic has caused a massive change in public space design principles. The first effect of the shift determined for the post-pandemic era is the six new principles spelled out by Oliver Hartleben, an expert in placemaking. The principles of 'polyfunctionality', 'loose fit', 'redundancy', 'access at all levels', 'modularity', and 'signaling', have changed with the impact of the pandemic. In this study, an attempt was made to analyze the circumstances of these principles before and after the pandemic. As a result of the analysis of the effects of the six principles in question on three selected study areas, it was determined that, compared to Beşiktaş and Üsküdar Squares, Kadıköy Square was most affected and changed by the pandemic, with the most design principles applications. This is because the community living in this vicinity has a high education level and is more aware of their surroundings. While some changes have remained in the design phase, some have been implemented into designs.

Along with the new living standards, public outdoor solutions need to be developed to understand the new social distance rules and hygienic conditions in urban environments. While 'polyfunctionality' was the principle most affected by the pandemic, 'signaling' was the least affected. As a result of this study, it was also revealed that the principles of 'Social Distance Adequacy and the Presence of the Concept of Hygiene' need to be added to the existing regulation principles.

While the 'multifunctionality' principle was developed through social distancing, the concept was not developed sufficiently. At the same time that roads and pavements should be designed wider after the pandemic, the use of public transportation should be increased, due to the heavy traffic problem brought by the increased use of private vehicles after the pandemic. This principle has not been developed sufficiently in terms of "using all parts of the space and dominating pedestrian roads by private vehicles". The 'adaptability' principle has been the second most affected principle by the concept of social distance after the pandemic. As seen in the field study, public transport stops and waiting areas should be increased, social distancing safe spaces are insufficient. Although 'access at all levels' has been heavily affected by the pandemic, it still has not been developed sufficiently in the study cases. After the pandemic, the streets should be slowed down more, the use of space should be increased, and the areas should be made more functional. 'modularity' has been developed after the pandemic, with the design practices foreseen and developed at an adequate rate. The parameter of performing only collective activities was insufficient. The 'signaling' and 'signaling principle' has been the one least affected by the pandemic.

With the new normal living standards, there has been a greater need for public open spaces. It has become important to design and implement public open spaces and green spaces that are accessible to everyone and respond to the physical and psychological needs of the people living in the city. Considering the changes experienced by cities and society during the pandemic process, it is necessary to work on the design principles to be developed for urban spaces. In this direction, public open space solutions should be developed in cities in accordance with the social distance rule and hygienic conditions are provided. Thus, post-pandemic cities will be more livable places against epidemics that can meet the needs of society and offer a healthy quality of life.

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