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Original Article

Post-Coronavirus Disease 2019 Opinions of Landscape Architects About Urban Open-Green Areas

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ABSTRACT

The purpose of this study was to find out if the coronavirus disease 2019 pandemic influenced landscape architects, who have key responsibilities in the planning, design, implementation, and sustainability of public open and green spaces, to reconsider their practice in urban open and green areas. The research was conducted with the landscape architects who have membership in the Union of Chambers of Turkish Engineers and Architects and Chamber of Landscape Architects. The main materials of this study are the participants (individuals with the title of landscape architect), questionnaire forms to ascertain the participants' opinions on the use of open-green spaces following the pandemic, prior scientific research on the topic, and software such as IBM Statistical Package for Social Science Statistics, IBM Statistical Package for Social Science Amos, and Excel used to digitize the research data. The results reflect the landscape architects' emphasis that open and green space utilization is essential to assisting public health in the fight against pandemics. Additionally, the significance of managing user density inside urban open-green areas, controlling access points into them, utilizing disease-resistant materials in urban furniture, connecting urban green spaces to nearby natural areas, and creating different areas for different age groups was emphasized. Understanding the socio-spatial consequences of the measures taken to prevent the spread of the pandemic and identifying the concepts related to emerging new lifestyles that combine work and life patterns are among the benefits to be obtained from the study.

Keywords: Landscape planning and design, post-pandemic landscape design, public health

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Introduction

Coronavirus disease 2019 (COVID-19) was declared a pandemic by the World Health Organization on March 11, 2020 (WHO, 2021), which seriously affected public health worldwide (Mahase, 2020) and continues to be an emergency that causes concern at international levels (Johnson et al., 2021). Negative psychological effects such as post-traumatic stress symptoms, confusion, and anger have been observed in those who have been quarantined as a result of the COVID-19 pandemic. Quarantine can have a significant and long-lasting psychological impact, so it is important to look at it from a broader perspective in the public interest and take steps to mitigate its effects, such as explaining what is happening and how long it will last, to make people more tolerant of the situation. They should be given meaningful tasks to accomplish while under quarantine (Yao et al., 2022; Holliday et al., 2020).

The consequences of the COVID-19 outbreak, which are particularly acute in densely populated areas, as well as the measures that have been implemented, provide insight into how future pandemic-resistant cities may be built. After the first case was reported in Türkiye, several limitations and procedures were put in place to prevent the spread of the virus on a local, regional, and national level. Physical distance regulations in open and closed public areas are the most important of these measures. Consequently, benches, which are deemed essential urban furniture in streets, squares, and parks, were initially prohibited during the pandemic to discourage people from congregating in these spaces. However, it was seen that such measures were not sufficient over time; restrictions and prohibitions were introduced on the use of open and green spaces. With the understanding that this alone was not enough in the fight against the COVID-19 pandemic, lockdowns (which became very strict, especially during the spread of the pandemic) continued throughout the country for a long time.

Open and green spaces provide important cultural and recreational ecosystem services as well as providing benefits to both mental and physical health (Aleya et al., 2021; Beyer et al., 2014; Cohen-Cline et al., 2015;

Kalayci Onac et al., 2021). While these benefits are often discussed in terms of reducing the prevalence or severity of conditions such as mental stress (Nutsford et al., 2013) or cardiovascular diseases (Seo et al., 2019), some of these benefits persisted throughout the pandemic (Slater et al., 2020; Soga et al., 2021), and its importance is further understood. Although there is no comprehensive study on the spread rate of the pandemic in open and green areas, the prohibition of these areas for use within the scope of measures has increased the desire of people to access and spend more time in these areas rather than indoors. All these restrictions mean that people need more activity areas close to their homes for daily exercise and/or recreation (Geng et al., 2021) and ease of access to these areas. It is vital, however, to question the safety of green spaces in locations where pandemics are widespread, according to Shoari et al. (2020).

It has been revealed that the number and size of open and green areas is insufficient, especially in urban areas (although it varies according to the cities), and the importance of the issue has been well understood with the pandemic. With the discussion of the necessity of taking social and physical carrying capacities into account in the planning and design of open and green spaces in Türkiye, this issue has still not been fully covered in practice. Moore and Hopkins (2021), in their study in which they compiled visitor management in urban parks and protected areas in 11 metropolitan cities from 10 different countries during the period when pandemic restrictions were eased, stated that parking areas, paths, and viewing points were used above capacity, staff were insufficient, and visitors could not maintain physical distance adequately. According to Rice et al. (2021), in the USA, the public supported the implementation of visitor capacity limitations in outdoor recreation areas where public health may be affected during the pandemic.

During the COVID-19 pandemic period in Türkiye, the use of open and green areas was limited; these areas were closed for use during periods of street restrictions, and they were opened to the use of citizens aged 65 and over in a controlled manner during the periods when partial flexibility was introduced. In this process, it was realized that there was a need to determine the carrying capacity at the entrance to open and green areas, especially in metropolitan cities, and a certain number of people began to be admitted to these areas in a controlled manner. With the transition to a controlled social life in the following periods, circles of certain sizes (3–4 m in diameter) and distances (2–3 m intervals) were drawn by many local governments, especially in metropolitan cities, in order to maintain physical distance in open and green areas to limit the usage area of family and/or friend groups of 4 people (Mansuroğlu et al., 2021).

During the COVID-19 pandemic, socio-spatial inequalities in using resources became evident, and the linear relationship between housing and income gave spatial clues to the class segregation of those who stay at home and those who cannot. The clustering of the disease among people isolated in homes devoid of green spaces was even more effective. Considering the different residential areas located in the city and outside the city, the inequalities in the distribution of green areas are striking. As an example, in Istanbul, although the absence of public green spaces in the densely populated Şirinevler area is conspicuous, private open-green spaces in the Zekeriyaköy district, where single detached houses are the norm, attract attention (Pehlivan, 2021).

Future cities require a shift in design and administration, notably in terms of increasing green space, in order to support the development of technology, creativity, and innovation. In many nations, the failure to achieve sustainable development objectives leads to unsustainable urban regeneration. According to Ferrini and Gori (2020), three main challenges can be identified for sustainable urban regeneration: environmental (climate change, carbon emissions, and use of resources), social (inequality, cohesion, and health), and institutional (management). In this context, a real "green revolution" in cities should be started with an increase in vegetation, and spaces should be created where life will continue its effectiveness (Ferrini & Gori, 2020; Wahaj et al., 2022). For this, it is vital to protect the natural/seminatural areas in the cities and to use the native plant species in the newly created green areas.

The COVID-19 pandemic has changed people's relationships with their environment in a way that can be long term. Foremost among these are people staying at home, preventing them from getting together and traveling, and reducing access to public parks. Despite the availability of a vaccine, taking strict measures during the pandemic is still important, especially when individuals reject physical distancing rules. All these reveal that open and green spaces are important for human health and well-being, especially in urban environments. Frederick Law Olmsted, the founder of the landscape architecture profession, served as the general secretary of the US Sanitary Commission during the American Civil War and initiated practices for improving the sanitary conditions of the military camps and protecting the health of the soldiers, such as the selection of suitable accommodation, the provision of drainage, the disposal of waste, and the ventilation of the tents. Going in a very different direction, focusing on postwar public health, physical and sanitary conditions, and epidemiology, Olmsted continued his work in this context at the end of the 19th century, when the country began to transition from a rural to an urban society. The cities of that period were polluted, crowded, and unhealthy places, and Olmsted focused on green space systems, believing that urban parks could serve as the "lungs of the city." Observing on his trips to Europe that in many cultures, parks are private property reserved only for the wealthiest, Olmsted demonstrated with a highly democratic approach that parks can be for all people, offering a green version of the town square, a place where people can come together and form a community (Fein, 1972). Referring to the importance of wide open spaces and plants to allow people access to fresh air and sunlight, Olmsted, together with Calvert Vaux, started to work on the Central Park project right after the second cholera outbreak in New York. After the loss of her first child to the cholera outbreak and the success of Central Park, Olmsted continued to design more than 100 public parks and recreation areas in different cities. With the increase in urbanization in Boston, an effective green area system (Emerald Necklace) has been created in the fight against disease factors caused by the wastes left in the surrounding swamp areas (Klein, 2021). Therefore, it is important not to prevent access to open and green areas in cities but to increase these areas and encourage their use in order to combat the disease.

In the second half of the 19th century, in the development of cities, many sources of disease were eliminated due to sanitation movements, and the living standards were improved by the use of various drugs and chemicals, which helped to prevent outbreaks. However, these changes in the physical environment; which are very different from previous generations, have created a secondary concern for public health. While millions of people living in the cities of developing countries are still living in unhealthy conditions, in countries with good incomes, various health problems created by welfare have begun to be faced.

Olmsted's professional experience, in addition to his knowledge of sanitation, also contributed to his experience in how to organize and run a

complex commission and how to oversee the work of a large multidisciplinary staff team. Olmsted's pursuit of larger social goals at any cost, his conflicts with the Central Park Board of Commissary and the Health Commission Steering Committee, and his insistence on authorizing the necessary money to do the job right are experiences for landscape architects to reckon with (Fisher, 2010). Main utopias known in urban planning and design literature such as Garden City, Beautiful City, and Le Corbusier's La Villette have always been defined through the fiction of health, the city, and the built environment. While these were being constructed, urbanism and design principles such as keeping the building density at a certain level, designing large green and public spaces, easy accessibility to urban services, always keeping the public interest at the forefront, and social equality came to the fore. It is possible to talk about five main titles: (1) Urban Life and Public Health; (2) Publicity; (3) City Centers and Local Economy; (4) Cities and Climate Change; and (5) Social Capital in Cities. The imaginations of utopists and the COVID pandemic made people question about urban planning and management (Özüduru, 2020).

The aim of this study is to reveal the problems experienced in urban open and green spaces during the COVID-19 pandemic with the approach of landscape architects, who are the most effective and competent professional group in the planning, design, implementation, and sustainability of open and green spaces in the city. While it is thought that the problems identified in the light of the data obtained from the survey conducted for this purpose will contribute to the work of the planning and design professional disciplines (especially in the implementation phase), a number of suggestions have been developed to prevent or reduce the effects of the problems.

Material and Methods

Material

The main focus of the research is to evaluate how the COVID-19 pandemic conditions influenced landscape architects' opinions on the usage of open-green spaces. Participants of the study (individuals who have a landscape architect degree), questionnaire forms to determine the opinions of the participants on the usage of open-green spaces after the pandemic, former scientific research about the subject, and software such as IBM Statistical Package for Social Science (SPSS) Statistics, IBM SPSS Amos, and Excel that have been used to digitize the research data are the main materials of this study. The questionnaire used in this study was approved by the Akdeniz University Science and Engineering Sciences Scientific Research and Publication Ethics Committee (Approval no: 04, Date: 13-07-2020), by the unanimous vote of the participants.

Method

The research has been completed in the four stages presented in Figure 1. The first stage of the research is based on the detailed literature reviews on the subject of the study.

In the second stage, the study universe was decided to be landscape architects residing in Türkiye in accordance with the research topic and question. The sample size that can accurately reflect the entire universe was determined using the formula proposed by Baş (2001). As of June 23, 2020, the Union of Chambers of Turkish Engineers and Architects (UCTEA, 2020) Chamber of Landscape Architects recognized its membership of 7449 as the total number of members (UCTEA Chamber of Landscape Architects, 2020). The sample's calculation had a 95% CI error of 5%. Therefore, the 366 respondents in the survey represent the relevant population. However, more questionnaires were used, and 400

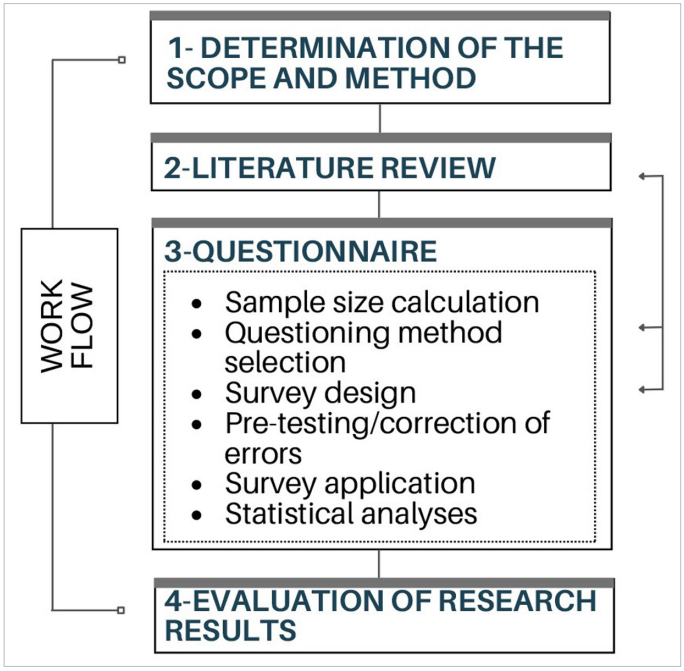

Figure 1.
Method Flow Chart

valid questionnaires were examined in order to boost the reliability of the survey and reduce the risk of missing, incorrect, and invalid surveys.

Since interviewing is a safer and faster way to acquire information, an online questionnaire with standardized formats was utilized to get responses from the participants on the use of open and green areas during pandemic situations in the third stage. A questionnaire consisting of two parts was prepared to determine the effects of the COVID-19 pandemic on the opinions of landscape architects about urban open and green spaces. The questionnaire consisted of 38 questions, including sociodemographic structure (12), the scale that questioned the opinions of landscape architects on the usage of urban open-green spaces after the pandemic (22), and human behavior in open and green areas (four questions). The provided questionnaire was principally produced in accordance with the opinions of specialists skilled in questionnaires and environmental sectors, urban open and green space, and landscape planning. The questionnaire's content, structure, meaning, and evaluation were all assessed by specialists. The preliminary surveys were administered to 20 randomly chosen landscape architects, and their final forms were determined by the feedback from these people. The survey was conducted in the period of August–December 2020.

In the last stage, the Statistical Package for Social Sciences version 20.0 software (IBM Corp.; Armonk, NY, USA) was used to evaluate the survey results. There are five different question categories in the survey: open ended, participation level (Likert scale 1–5), 3-option/in order of importance, single choice, and multiple choice. Three options, multiple-choice questions, open-ended questions, and rating criteria made up the items in the first and second parts. The IBM SPSS 20.0 and IBM SPSS Amos software were used to code and assess the data collected from the questionnaires. The data were analyzed using descriptive statistical methods, explanatory factor analysis, reliability analysis, confirmatory factor analysis, and structural equation modeling. To ascertain the degree and frequency of involvement in the questionnaire scales,

Table 1.
Distribution of Normality

	Statistics	sd	*p*
Opinions on the use of open and green spaces and practices during the pandemic	.084	400	< .001

"frequency analysis" was performed. For the purpose of determining if the comparison tests for two or more variables are parametric or not, the "Kolmogorov–Smirnov and Shapiro–Wilk tests" were used to examine the normality of the data set (Table 1).

Cross-charts were employed in data analysis to compare the variables and display the reciprocal sub-options of the binary variable together. To establish whether the comparison tests for two or more variables must be parametric or nonparametric tests, the data set was checked for normality using the "Kolmogorov-Smirnov and Shapiro-Wilk tests." The study revealed that the data did not follow a normal distribution, and the tests most appropriate for the investigation's goals were selected from a list of non-parametric tests and used (Griffith, 2010). The "Chi-square test" was applied to the comparisons to establish the degree of significance of the data.

Results

Demographic Features

Demographic characteristics of landscape architects participating in the research were determined by frequency analysis and presented in Figures 2–6.

Of the landscape architects who participated in the survey, 67.3% (269 people) were female and 32.8% were male (131 people). While undergraduate graduates (46.3%) have the highest rate of participation, the rate of doctoral graduates is 30.3%, and the rate of master's graduates is 23.5%. About 54.0% of the respondents are single.

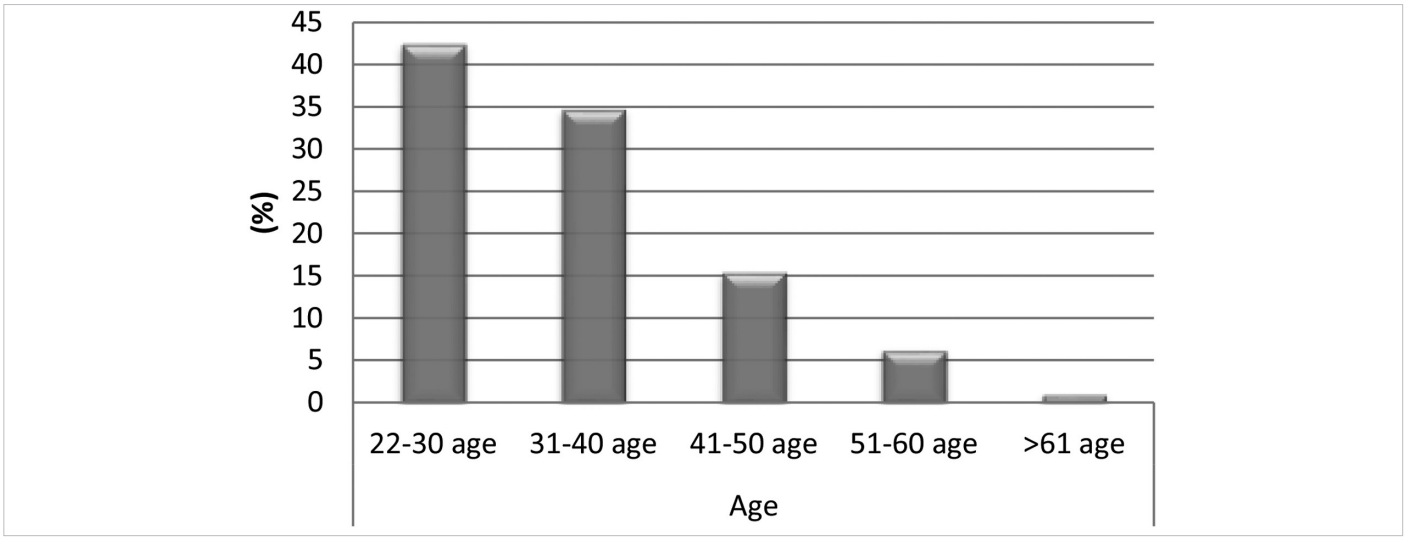

Figure 2.
Age Groups of the Participants.

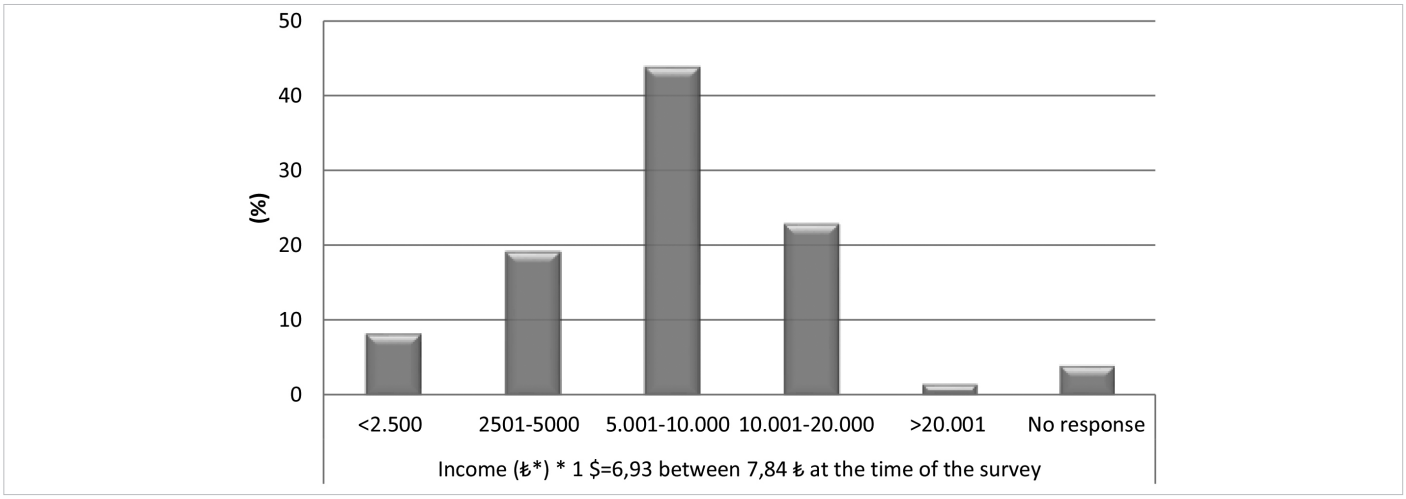

Figure 3.
Professional Experience of the Individuals.

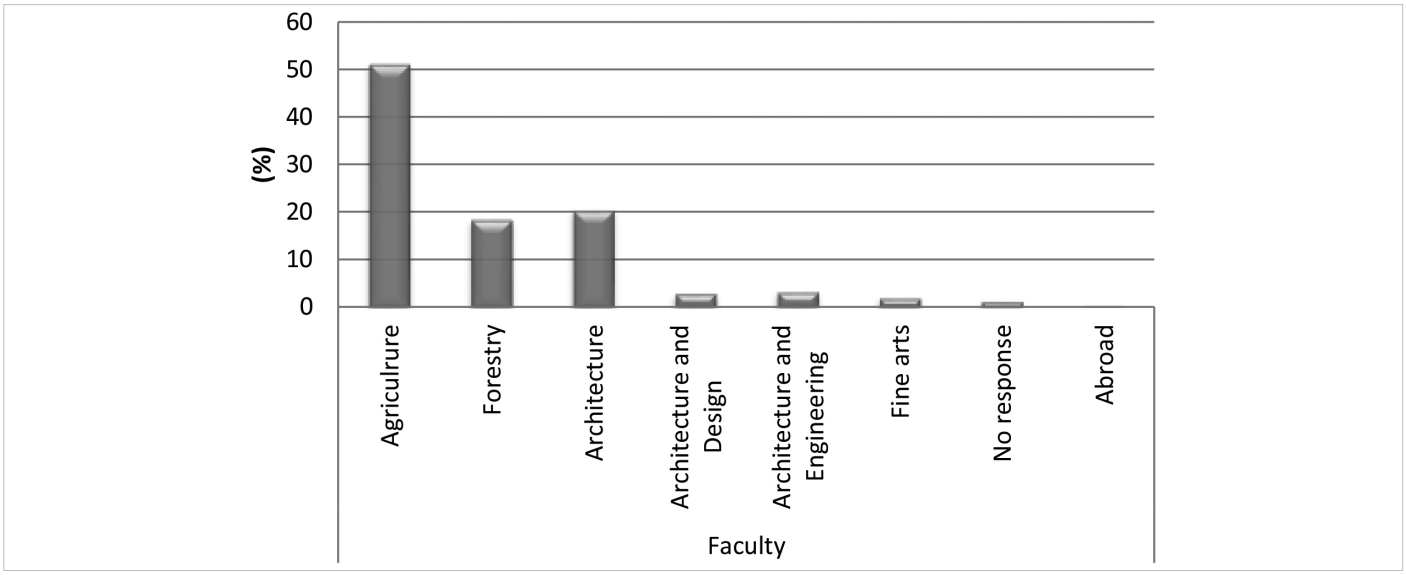

Figure 4.
Income Level (monthly).

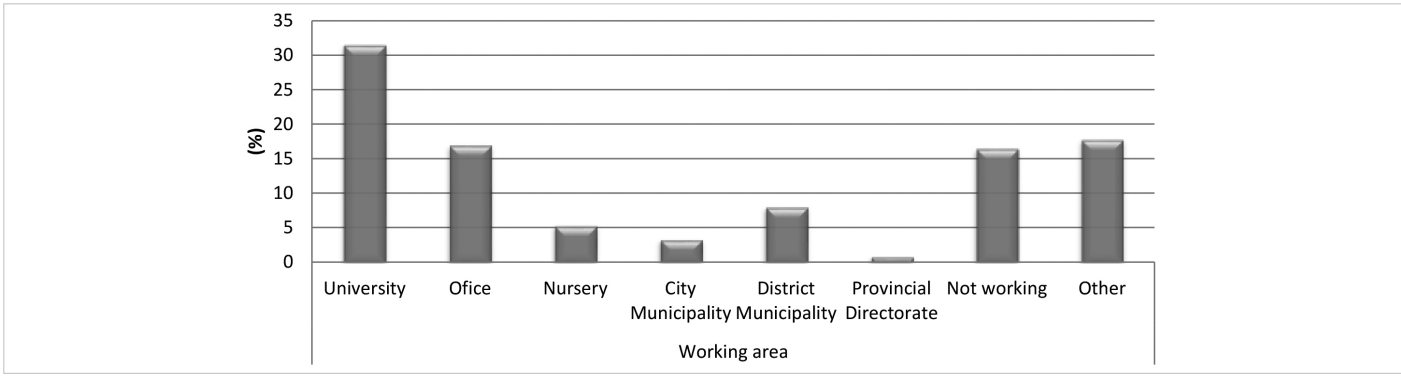

Figure 5.
Graduate Faculties.

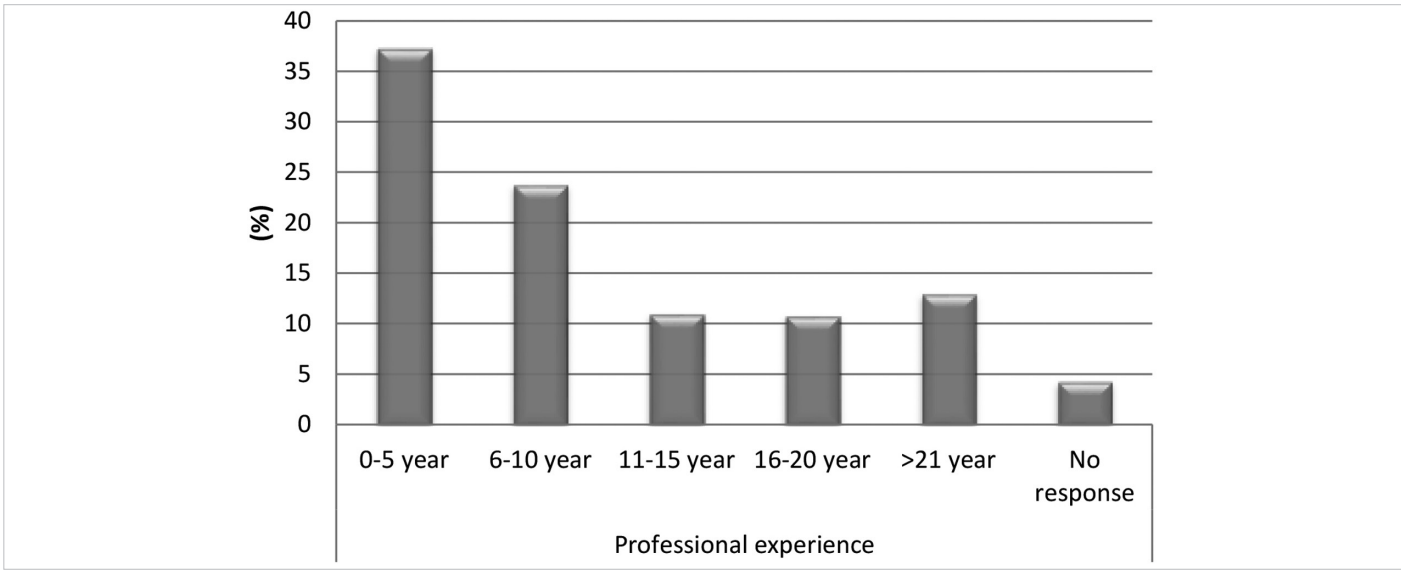

Figure 6.
Working Areas of Participants.

The youngest person participating in the study is 22 years old (6 people), and the oldest person is 65 years old. The average age of the participants is 34.3. The participation level of the 22–30 age group (42.5%) is the highest (Figure 2).

The average professional experience of the individuals participating in the research is 10.8 years, and the rate of those who have been performing their profession for 0–5 years is 37.3% (Figure 3).

Participants with a household income of less than 2500 TL are 8.3%, and those with a household income of 20,001 TL or more are 1.5% (Figure 4). Those with an income of 5001–10,000 TL have the highest rate (44.0%). About 64.3% of the participants stated that they are registered with the Chamber of Landscape Architects of UCTEA.

Due to the fact that landscape architecture education started within the Faculties of Agriculture in Türkiye, the majority of the respondents (51.2%) graduated from these faculties (Figure 5). In recent years, departments established within different faculties and some departments within the Faculty of Agriculture and/or Forestry were transferred to the Faculties of Architecture (20.5%), Architecture and Design (3.0%), or Engineering and Architecture (3.3%). The number of landscape architects who graduated from these faculties is increasing day by day.

When the working areas of landscape architects who participated in the survey are examined, 31.5% of the respondents are working as academic staff in universities (Figure 6). While the rate of those who state that they work in design offices is 17.0%, the rate of those working within the municipality is 11.3% (8.0% city/district municipality and 3.3% metropolitan municipality). About 43.6% of the landscape architects who participated in the survey work in various public institutions (31.5% university, 11.3% municipality, and 0.8% provincial directorate), and 22.3% work in offices and nurseries. Among the participant landscape architects, the rate of those who do not work currently is 16.5%. The rate of landscape architects who stated their place of work as other but did not write any explanation is 17.8%.

Post Coronavirus disease 2019 Opinions of Landscape Architects About Urban Open-Green Area Planning and Design Issues

Since the 19th century, pathogenic viral outbreaks have resulted in complex transmission between humans and other species, posing serious threats to public health and safety (Reperant & Osterhaus, 2017). Over the past decades, humanity has suffered from various epidemics such as the Spanish flu, Middle East respiratory syndrome Coronavirus, hemorrhagic fever viruses (Lassa, Ebola), and severe acute respiratory syndrome coronavirus (de Groot et al., 2013; Trilla et al., 2008; Wang et al., 2020; Weber et al., 2016). From the devastating "cholera" epidemics in London in the mid-19th century to the infamous "typhoid" epidemic that arose in New York a little over a century ago, these diseases have had a significant impact on modern urban planning, design, and development. In at least the last two centuries, the measures developed against such diseases (construction of modern sewage systems, water treatment plants, hospitals and clinics, and the establishment of zoning regulations, health boards, various practices designed to limit the spread of diseases, etc.) have contributed to the creation of healthier and safer urban environments. But with the COVID-19 pandemic, it seems that cities (and indeed suburbs and rural communities as well) are still very vulnerable to airborne infectious diseases (Bereitschaft & Scheller, 2020). As a result, a thorough exploration of urban environments prompts an evaluation of the availability and quality of open-green spaces accompanied by the intricate challenges inherent in their design. In this pivotal endeavor, the expertise of landscape architects becomes paramount. As adept professionals intricately involved in conceiving, planning, executing, and sustaining urban open-green spaces, their role is of utmost importance. Thus, this study takes a unique approach by delving into the perspective of landscape architects, recognized for their significant influence, to meticulously uncover the nuanced issues that arose within urban open-green spaces during the unprecedented COVID-19 pandemic. Through a comprehensive survey, this investigation unearths valuable firsthand insights from these experienced practitioners, shedding light on the complex fabric of urban planning and the design challenges presented by the pandemic.

Descriptive analysis and non-parametric comparison tests were employed to assess the degree of involvement in 21 opinions, where participants evaluated the roles of landscape architects in the planning and design of projects undertaken in urban green spaces during the pandemic. Frequency analysis was applied to the data in order to evaluate the approaches of landscape architects about what the pandemic taught to the planning and design profession disciplines during the pandemic, and the practices applied during this period and their level of participation in the opinions presented to them were determined.

According to the data obtained (Table 2), the highest participation rate was calculated for Opinion 5 (mean: 4.82), while the lowest level of participation was calculated for Opinion 19 (mean: 3.26). The contradiction between the opinion "natural areas in cities should be protected" with the highest level of participation and the opinion "natural plant species and green areas with biodiversity are more effective in combating the pandemic," which is in the second place with the lowest level of participation, explains that landscape architects who participated in the survey do not have enough knowledge and experience in this regard. According to Foley (2020), it has been determined in various scientific studies that microbial activities in cities are shaped depending on the relationship between plant and soil; the use of native plant species in these areas and the strong biodiversity have positive effects on the immune systems of people.

When Table 2 is examined, it is seen that the participants' level of participation in the opinions about the need to determine the social-physical carrying capacity in the parks and to control the user density in the parks is higher. These opinions suggest that the open and green areas in Türkiye may not be suitable for the implementation of such restrictions in terms of quality and quantity. As a matter of fact, Uchiyama and Kohsaka (2020) state that visits to green areas during the COVID-19 pandemic gain importance globally from more than one point of view (wealth, planning, social justice, and equality), while they also state that socioeconomic factors especially affect the frequency of visiting green areas. While addressing a similar issue in the example of Istanbul in Pehlivan (2021), he expressed the injustice of access to open and green spaces. Therefore, considering the fact that the existing open and green areas are not of sufficient size and considering that a certain segment uses them more, the imposition of capacity restrictions on these areas in the current situation may mean that another injustice of access will arise. However, 62.3% of the participants strongly agree and 32.8% agree with the statement (average: 4.55) that *the principle of equality should be taken into account when accessing green areas.*

Results on Post-COVID 19 Opinions of Landscape Architects About Urban Open-Green Area Planning and Design

An analysis of potential hypothetical relationships between data gathered from responses from 400 individuals was carried out in this section of research, which was aimed at reducing variables to the bare minimum.

In the exploratory factor analysis, which was conducted to reveal the relationship between 21 statements addressed to the participants in the relevant section, the reliability coefficient of the statements was calculated before the categorization process (Cronbach $\alpha = 0.878$). Before applying the factor analysis, the Kaiser–Meyer–Olkin (KMO) test was applied to test the suitability of the sample size for factorization. Since the KMO value was 0.873, it was concluded that the data structure was "adequate" for factor analysis. However, the analysis was completed with 15 expressions as a result of the fact that some expressions were not fully factorized and/or included in more than one factor group, and these expressions were sequentially removed from the analysis (Table 3). It is determined that the 15 statements included in the analysis are grouped under four factors. The variance explained by these factors regarding the scale is 64.571%.

Analysis results show that there is a significant difference between some factors ($F = 96{,}757$; $p < .001$) (Tables 4 & 5). In other words, participant opinions vary significantly depending on the factors. According to the results of the analysis carried out to find out between which groups the differences between the factors are, it is understood that the factors related to social distance and carrying capacity have a significant relationship with other factors (Table 5).

When the subdimensions resulting from the explanatory factor analysis and reliability analysis are tested with the confirmatory factor analysis, the index of goodness of fit is relatively high. The established model is given in Figure 7.

The coefficient values between the components are anticipated to be equal to or below 0.80 in confirmatory factory analysis and structural equation models, whereas the regression coefficients of the variables are expected to be equal to or above 0.30 (Hoyle, 1995). The fit indices between all variables are within predicted intervals, according to the findings of the structural equation model shown in Figure 7. As a result, this model has demonstrated the validity of the measures employed in this study, implying that the planned factors can be quantified using the questionnaire used in this study (Table 6). This signifies that the methods employed in this study to determine the attitudes of

Table 2.
Participation Rate of Respondent Landscape Architects of the Opinions About Post COVID-19 Urban Open-Green Areas Planning and Design Issues (%)

		(1)*	(2)	(3)	(4)	(5)	Std. D	Mean
Opinion 1	Entrance and exit to the parks and the user density inside should be controlled.	1.8	5.8	6.0	41.0	45.5	0.923	4.22
Opinion 2	Social carrying capacity of parks should be calculated.	0.8	0.8	2.3	27.3	69.0	0.643	4.63
Opinion 3	Physical carrying capacity of parks should be calculated.	0.5	0.5	1.3	29.8	68.0	0.587	4.64
Opinion 4	It is necessary to invest in all open and green spaces in cities.	0.5	0.5	6.8	30.3	62.0	0.689	4.52
Opinion 5	Natural areas in cities should be protected.	0.3	0.0	0.3	15.8	83.8	0.422	4.82
Opinion 6	New technologies (such as nanotechnology) that are resistant to microbes should be used in urban furniture.	1.0	0.8	6.5	36.0	55.8	0.737	4.44
Opinion 7	Maintaining social distance should be considered in plant design.	2.5	5.0	8.0	31.0	53.5	0.981	4.28
Opinion 8	Urban agriculture and hobby gardens are important.	0.8	0.3	7.0	35.3	56.8	0.703	4.47
Opinion 9	Green space applications in buildings (such as facade planting, balconies, terraces and roof gardens) should be increased.	0.5	2.8	3.3	31.3	62.3	0.735	4.52
Opinion 10	Among the public spaces, the most functionally important areas are open and green spaces.	0.3	0.8	3.0	34.0	62.0	0.617	4.56
Opinion 11	During the pandemic, people tended to open and green spaces the most.	1.0	2.8	4.0	32.5	59.8	0.784	4.47
Opinion 12	Special arrangements should be made for age groups in park design.	0.3	1.3	6.3	31.3	61.0	0.693	4.51
Opinion 13	New urban furniture designs that take social distance account must be developed	1.3	0.8	4.5	34.5	59.0	0.732	4.49
Opinion 14	Plant partitioning should be used in areas where human activities are intense, such as walking paths or sitting areas.	2.0	4.0	9.0	33.5	51.5	0.930	4.28
Opinion 15	Natural areas should be included in the open and green area system.	3.0	6.5	12.5	31.0	47.0	1.054	4.12
Opinion 16	A connection should be established between open and green areas and natural areas around the city.	1.8	2.3	6.5	32.8	56.8	0.847	4.40
Opinion 17	Afforestation of urban avenues and streets is important.	0.3	0.0	1.3	23.0	75.5	0.500	4.73
Opinion 18	The importance of pedestrian and bicycle transportation has increased even more.	0.3	0.3	5.8	26.0	67.8	0.632	4.60
Opinion 19	A field hospital can be established in open and green areas.	12.0	12.8	29.5	28.0	17.8	1.236	3.26
Opinion 20	Natural plant species and green areas with biodiversity are more effective in combating the pandemic.	2.8	3.5	27.5	33.3	33.0	0.992	3.90
Opinion 21	It is necessary to consider the principle of equality in accessing green spaces.	0.5	0.5	4.0	32.8	62.3	0.646	4.55

Note: *(1) Strongly disagree; (2) Disagree; (3) Neutral; (4) Agree; (5) Strongly agree.

Table 3.
Factor Distribution Regarding on the Post-COVID19 Epidemic Opinions of Landscape Architects

Propositions	Factor 1	Factor 2	Factor 3	Factor 4	Mutual Factor Variance	Mean
It is necessary to invest in all open and green spaces in cities.	0.579				0.374	4.52
Natural areas in cities should be protected.	0.663				0.447	4.82
Urban agriculture and hobby gardens are important.	0.487				0.279	4.47
Among the public spaces, the most functionally important areas are open and green spaces.	0.611				0.409	4.56
Afforestation of urban avenues and streets is important.	0.753				0.640	4.73
The importance of pedestrian and bicycle transportation has increased even more.	0.609				0.366	4.60
Natural plant species and green areas with biodiversity are more effective in combating the pandemic.	0.360				0.999	3.90
It is necessary to consider the principle of equality in accessing green spaces.	0.629				0.424	4.55
Maintaining social distance should be considered in plant design.		0.570			0.558	4.28
New urban furniture designs that take social distance account must be developed		0.489			0.567	4.49
Plant partitioning should be used in areas where human activities are intense, such as walking paths or sitting areas.		0.858			0.774	4.28
Natural areas should be included in the open and green area system.			0.895		0.889	4.12
A connection should be established between open and green areas and natural areas around the city.			0.691		0.703	4.40
Social carrying capacity of parks should be calculated.				0.770	0.971	4.63
Physical carrying capacity of parks should be calculated.				0.716	0.870	4.64
Variance (%)	37.526	10.742	9.304	6.999	56.143	—
Eigenvalue (Original Value)	7.097	1.690	1.608	1.210	—	—

landscape architects toward open-green area planning and design in the post-pandemic era have been statistically validated.

The COVID-19 pandemic process, which has completely changed life all over the world, has brought up the necessity of reconsidering the planning and design practices of open and green spaces, which are the most important urban components where people can contact nature in crowded cities in terms of landscape architecture professional discipline, as in many professional disciplines. In the study, a scale was developed to determine the approaches of landscape architects regarding the works to be done in urban open-green areas during and after the pandemic process, and this scale was tested with confirmatory factor analysis and structural equation modeling techniques. According to the data obtained as a result of the analysis, the operability of the scale produced within the scope of the study has been statistically verified, and important data have been obtained that can form the basis for further studies on this subject. Based on the findings of the study, given the evolving living conditions during and post-pandemic, it is suggested that the overarching approaches of landscape architects be comprehensively addressed and systematized, commencing from high-level planning endeavors concerning open-green spaces. This should extend to encompassing the design processes and elements involved. It has been determined that aligning with the imperative of accessibility and transitioning towards ecosystem-based approaches serves as mitigation and prevention strategies for potential pandemics or environmental challenges.

Table 4.
Descriptive Statistics by Factors About Post-COVID 19 Opinions of Landscape Architects About Urban Open-Green Area Planning and Design

Factors	*n*	$\bar{X}$	ss
Urban Planning (Factor 1)	400	4,52	0,60
Social Distance (Factor 2)	400	4,35	0,75
Ecological Planning (Factor 3)	400	4,26	0,89
Carrying Capacity (Factor 4)	400	4,63	0,42

Table 5.
Comparison of the Post-COVID 19 Opinions of Landscape Architects about Urban Open-Green Area Planning and Design According to the Factor Groups

Factors		sd	Sum of Squares	Mean Square	*F*	*p*
Urban Planning (Factor 1)	Between groups	41	63,003	0.186	*1.058*	.380
	Within groups	358	7634	0.176		
Urban Planning (Factor 1) Social Distance (Factor 2)	Between groups	41	33,123	0.808	*1.486*	**.032**
	Within groups	358	194,619	0.544		
Ecological Planning (Factor 3)	Between groups	41	34,329	0.837	*1,050*	.393
	Within groups	358	285,581	0.798		
Urban Planning (Factor 1)	Between groups	41	21,660	0.528	*1.536*	**.023**
	Within groups	358	123,164	0.344		

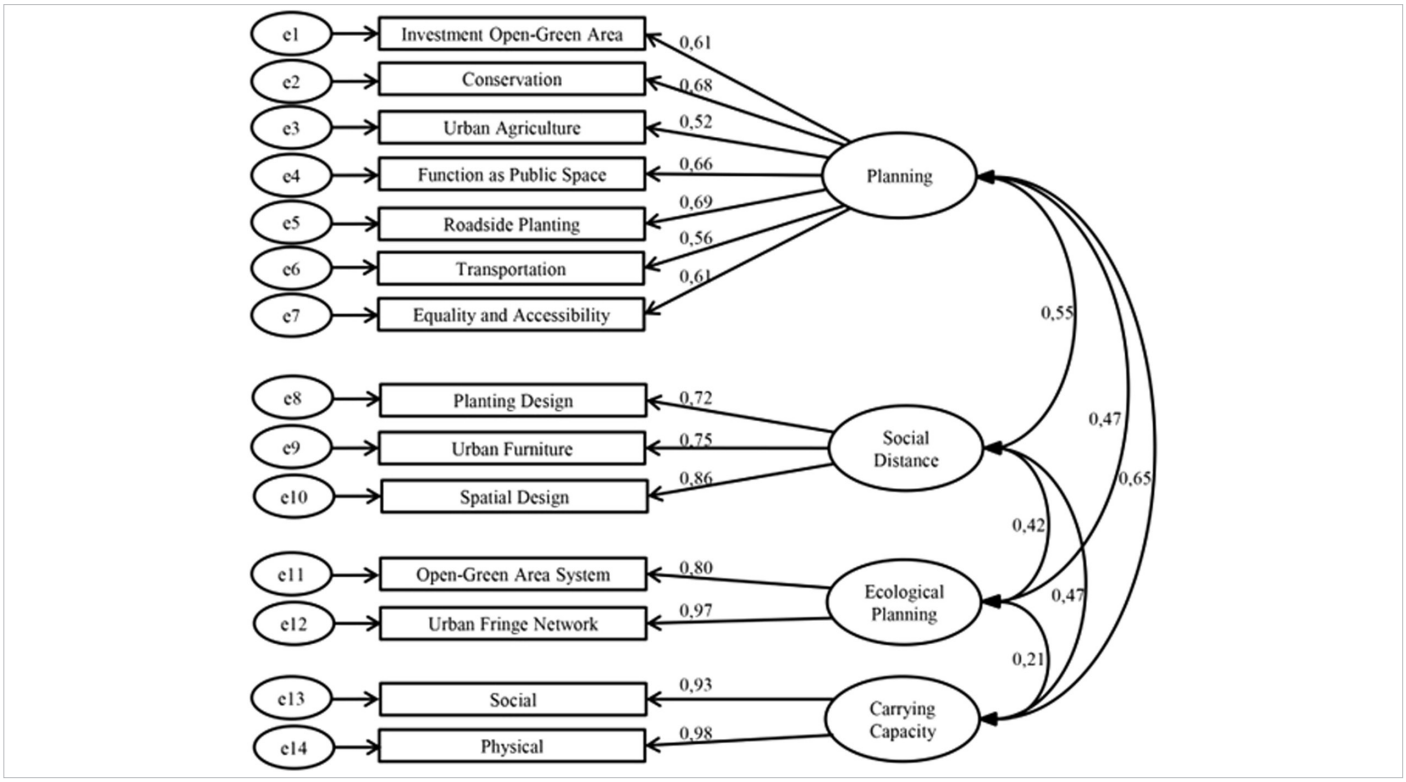

Figure 7.
Structural Equation Model of Attitudes of Landscape Architects to Open-Green Area Planning and Design in the Post-pandemic Era.

Discussion

It has been observed that the long-term curfews on the public's access to open and green spaces, which have social, psychological, and many contributions to human health, create serious pressures on the society. In order to reduce the impact of the problems experienced, in line with the opinions and suggestions of community health experts, sociologists, and psychologists, especially citizens aged 65 and over were allowed to use the parks and open spaces at certain hours by observing their social and physical carrying capacity at certain hours. This situation is especially important in terms of revealing the contribution of open and green spaces to human health in terms of public health during the pandemic period. The importance of socializing, walking, running, or spending time in the outdoors for a certain distance and/or time has been understood once again. Quality and quantity are becoming more important when it comes to the suitability of our open and green spaces in terms of social and physical carrying capacity. However, it has been seen that the structural and plant materials that will regulate the physical distance are important. After 150 years of Olmsted's studies, the place and importance of the need for the existence of open and green spaces in cities was re-understood.

Table 6.
Confirmatory Factor Analysis Goodness-of-Fit Indices for Attitudes of Landscape Architects to Open-Green Area Planning and Design in the Post-Pandemic Era

Model of the Scale	
The ratio of Chi-square to degrees of freedom (CMIN/df)	2.5
Root Mean Square Error of Approximation (RMSEA)	0.023
RMSEA	0.062
Goodness of Fit Index (GFI)	0.936
Adjusted Goodness of Fit Index (AGFI)	0.905
Comparative Fit Index (CFI)	0.959

Spending time in parks and green spaces is effective in reducing stress, improving cognitive functioning and physical health, and benefiting the psychological, emotional, and general health of residents. During a time of stress, such as a pandemic, steps should be taken to make the services listed here as widely accessible as feasible. For example, public open and green spaces such as botanical gardens, arboretums, and walking areas within the city are very suitable for establishing physical distance rules, and more stringent regulations should be applied in areas where crowding of visitors is likely, such as beaches and playgrounds. The urban furniture used in these areas was discussed on the basis of their effects on the spread of the disease during the COVID-19 pandemic. Items such as traffic barriers, street lamps, trash cans, mailboxes, bus stops, signboards, benches, manhole covers, fountains, and similar objects emerged in Europe and North America during the 20th century. They have come to be collectively known as "urban furniture" or "street furniture" within the terminology of urban planning and design. Objects established along avenues and streets (de Ruggiero et al., 2019; Soffritti et al., 2020) are designed by different professional disciplines (landscape architects and industrial product designers) in urban open and green spaces to meet the needs of the urban population in public spaces (Ghorab & Caymaz, 2014). Urban furniture, according to Arruda et al. (2017), has become an essential part of the regions where modern society spends the majority of its time. People's demands for urban furniture are increasing not only for basic functions but also for increasing the quality of daily life such as safety, hygiene,

comfort, and recreation (Soffritti et al., 2020; 2018). Traditional urban furniture in urban open and green spaces is still considered risky by a certain segment of the society. People who need socialization cannot feel safe while sitting on a bench or gathering around a table due to their inability to maintain physical distance. Similarly, it is possible to say that this concern increases at bus stops, especially in urban transportation vehicles. Especially in the use of lidded trash cans and seating elements, there are concerns about the transmission of viruses by contact with objects on users. The planning and design of open spaces and the current state of the urban furniture used may have a structure that may adversely affect public health in epidemic conditions. For this reason, the importance of multi-disciplinary studies of related professional disciplines on how to improve urban open and green spaces up to the scale of urban furniture is increasing.

According to Pehlivan (2021), starting from COVID-19, adequate levels of open and green spaces can play a role in reducing inequalities in urban space while providing physical distance. Therefore, spatial experiences during the COVID-19 pandemic process can make important contributions to the prevention of future pandemics. In the historical process, it is seen that epidemic diseases have caused great transformations in cities. The global COVID-19 outbreak may also offer an opportunity to transform cities and space while rethinking the understanding of urbanization that protects and improves health. There was a need for solutions that prioritized public health while reconstructing cities that would be fair for everyone and would not cause the destruction of nature. In this respect, attention can be drawn to the "self-sufficient neighborhoods" models, by taking the experiences of the pandemic into account. While the concept of "physical distance" as a pandemic measure is vital for public health, the concept of "physical proximity" comes to the fore to ensure controlled movement in the city (Balaban, 2020). Accordingly, the COVID-19 pandemic has once again reminded us of the importance of planning essential services within an accessible distance. In this context, the example of Plan Melbourne can be studied. Prior to the outbreak, the Victorian Government identified a long-term planning strategy, which was carried out in partnership with the Victorian Heart Foundation and the Department of Environment, Soil, Water, and Planning: Plan Melbourne 2017–2050. This plan is supported by the principle of 20-minute neighborhoods and is based on the "local lifestyle." The strategy of the Melbourne Plan is to establish jobs, urban services, and transport options close to the living area. Thus, it gives people the opportunity to meet most of their daily needs within a 20-minute walk from their home, with safe bike paths and local transportation options. The Melbourne Plan aims to create healthier and more equal societies by creating neighborhoods connected by mixed land uses, different types of housing, safe bike lanes, and local transport options. Although this model is not new, it can be a guide for the post-epidemic urbanization phenomenon (DELWP, 2017).

Our changing preferences and expectations regarding open and green spaces with the COVID-19 epidemic, as well as the experiences we have gained, can lead us to new design strategies. For example, more space can be created for individualized and introverted uses, running tracks and roads can be expanded, new assessments of physical distance can be made, and places where people can exercise in open and green spaces can be created. Based on our observations, we can say that although people are forced to stay at home in this pandemic, the tendency to go to green areas is significantly higher before the pandemic. Even the small parks and playgrounds in the neighborhoods have gained more value for people. In this case, it is important for landscape architects to work to provide easily accessible opportunities to open and green spaces.

Future cities should be planned in such a way that they will be resistant to adverse situations by taking into account the threats to human life such as climate change and epidemics, by producing solutions especially for transportation and physical activities of people in cities, by taking into account the access of cities to food, and by rearranging open and green space systems. In this context, it is important to equip urban information systems with versatile and constantly renewed data and to use them actively in all studies. Reducing and preventing environmental problems faced by cities will be possible by protecting natural areas in urban areas and benefiting from their restorative power. Otherwise, every intervention to nature will cause a new problem to arise, and this may result in an increase and diversification of problems. In order to support the sustainable and resilient cities of the future, there is a need for holistic and dynamic planning and design approaches based on human health, environmental education, and urban ecology based on human–nature relations.

The year 2020 is a year in which Olmsted's work has begun to be examined more, and it has once again been the beginning of our understanding of the importance of open and green spaces for the quality of life of those living in cities in the face of the COVID-19 epidemic. As we come to 2022, the 200th anniversary of Olmsted's birth, we are in a period where more serious and widely spreading public health problems intersect with landscape architecture, architecture, and urbanism practices. Landscape architects, like all design disciplines, must come up with the strategies and policies needed to identify problems and solve them in collaboration with different disciplines. In doing so, landscape architects should not only act as experts working in shaping or managing the land but also as a managers of these teams of different disciplines. Olmsted's design principles and philosophy offer important lessons to guide us through the epidemic, showing that landscape architects should work effectively in this direction in terms of public health today.

The experience of the COVID-19 outbreak reminded landscape architects that health criteria should be taken into account in the planning and design of open and green spaces in cities. In this context, to produce solutions with the participation of interest groups to determine new uses and applications in cities, to increase accessibility to public open and green spaces, to support non-motorized transportation opportunities and pedestrian transportation that can be an alternative to public transportation in cities, to use roofs, facades, terraces, balconies, and even windows as green spaces in the city, and to take the experiences gained through pandemic conditions into account in creating green spaces and designing streets and avenues are essential. As a result, it is important for landscape architects, who have important tasks in the planning, design, implementation, and sustainability of open and green spaces in the city, to develop new understandings about the effects on cities during and after the pandemic and the characteristics of urban areas after the pandemic. In this context, the multifaceted positive effects of green spaces in cities on the human environment should be taken into account. It should be emphasized that the plants used in these areas are not only decoration elements and that ecosystem services should be considered before art in landscape architecture, and interdisciplinary multidimensional studies should be carried out in order to realize all these. Incorporating diverse areas of expertise, departments, and services under a single, participatory governance framework is a key facilitator for all of the above. In this way, cities can facilitate the interactions of urban planning and design in supporting climate neutrality and disaster resistance and be empowered to create healthier and safer environments.

The COVID-19 pandemic has underscored the critical role of urban open and green spaces in enhancing the well-being of city dwellers. By examining the opinions of landscape architects, this study gained insights into the ways in which these spaces have become even more essential during pandemic conditions, emphasizing the heightened importance of factors like social distancing and carrying capacity. The results of the study underscore the significance of multi-disciplinary collaboration in addressing urban challenges by discussing the intersection of landscape architecture with public health, sociology, and psychology, highlighting how these disciplines can work together to create healthier and more resilient urban environments. This reflects the broader impact of the study beyond landscape architecture. The discussion of "self-sufficient neighborhoods" and the emphasis on accessibility to essential services reflect the potential of this research to guide urbanization strategies that prioritize health, well-being, and sustainability. Besides, the study draws a connection to the historical significance of open and green spaces in urban planning, invoking the legacy of Olmsted, and this historical context highlights the enduring relevance of the research as well as the potential for the findings to contribute to contemporary discussions and strategies.

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