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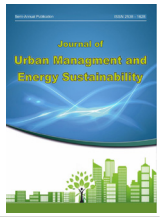

ORIGINAL RESEARCH PAPER

The role of open and semi-open space on social interactions during the coronavirus pandemic (Case study: Bamland of Tehran)

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ABSTRACT

In general, urban spaces and environments should be designed in such a way to increase social interactions at different stages. One of the most important consequences of Iran today is the spread of the Corona virus, which has led to the suspension of social interactions in the society. In this effect, it is expected that the urban space will be reproduced in a relatively different way, and in this reproduction, the relations between the centers of activity, residence and space will be transformed, and it will reproduce a new behavior. The main purpose of this research is to investigate the role of open and semi-open space on the quality of social interactions of people during the Corona pandemic. The method of collecting information was library and field research. The tool used to collect the necessary information was a questionnaire. Daily visitors to Bamland are 500 on average and according to Cochran's formula, the sample size was 310 and the questionnaire was randomly distributed among the people, at last, 210 questionnaires were included in the analysis process. According to the findings, due to the linear design and greater connection of the complex with open and semi-open spaces, it has been able to continue its existence in the era of Corona, and according to the surveys, the attitude, spatial layout and open and semi-armed spaces, the arrangement of the spaces next to each other, have an effect It has a direct effect on how spaces are used and expresses meaningful social relationships.

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1. Introduction

These days, the world is involved in an epidemic that can almost be said to have affected all the people on this planet and has made the mind focused on itself and not paying attention to any other issue in the world. This small virus, which we never thought would become so famous and global, has left almost no part of the earth unaffected, and this can be considered one of the wonders of the last century. All thinkers believe that the world after Corona will be very different from the world before Corona pandemic. Now the question is: How and in what areas will these changes transform people's lives? It will certainly be one of the most important transformations in architecture and urban planning. Architecture and urban planning have always been influenced by people's behavior and way of life, and economic problems, disasters and global diseases have always turned into opportunities that have completely changed urban and suburban lives. In the first quarter of 2020, the international community took a series of measures designed to slow the spread of the new coronavirus (Covid-19). Many of these measures included lockdown strategies aimed at severely reducing people's mobility (Google, 2020). The fast situation coupled with the provision of poor or insufficient information has caused a number of human behavioral changes (Goldman, 2020), along with wide-ranging psychological effects (Brooks et al., 2020). For example, in a survey in which people spent 20 to 24 hours a day in quarantine, more than half reported moderate to severe psychological effects of COVID-19, and a third reported moderate to severe anxiety (Wang et al., 2020). Urban open and semi-open spaces provide a range of benefits to human health and well-being that can potentially ameliorate some of these acute stresses. This pandemic has not only provided a unique opportunity to investigate the changes in the use of urban open and semi-open spaces under this set of special conditions, but also to collect information about the reasons why people visit open and semi-open spaces. The health and well-being benefits of urban space can reduce many of the stresses associated with city life. (Houlden et al., 2018; Twohig-Bennet & Jones, 2018). More broadly, experiences of space can play an essential role in mental health during stressful life events. Urban open and semi-open spaces can help increase resilience and individual and social interactions in stressful times. Resilience and psychological interactions are the processes that a person undertakes to adapt to adversity, trauma, tragedy, threats, or significant sources of stress (American Psychological Association, 2012).

In recent decades, the study of the environment and social behavior has attracted the attention of many researchers. Human behavior is a product of the environment and biology and the interaction of these two with each other. Urban public spaces, especially parks, are one of the most important parts of the city where the most contact, communication and interaction between people takes place (Tibalds, 1383: 15). In fact, these spaces are part of the open and public spaces of the city where urban life flows. has it. All people can access these spaces and interaction and confrontation are one of its most important features. Creating relaxation, entertainment, providing communication, the context of socializing and the possibility of movement are other functions of public spaces in the city, and the atmosphere of these spaces is very useful and necessary to prevent helplessness, depression, isolation, and violence, and these spaces are an opportunity for the growth of creativity. It brings a constructive environment in an urban complex (Pakzad, 2014: 38) and it is considered one of the most important criteria in the evaluation of cities and urban environments, the quality of the city's public spaces such as parks, and people are based on the quality of what they see around them and they experience, they judge about it (Tibalds, 1383:25) the qualities to be considered in urban design that (Rafiian et al., 1388:234) include identity, continuity of centrality, quality of public space, ease of movement, legibility, Adaptation, variety and vitality, meaning, access, control and supervision, compatibility, efficiency, justice, flexibility, visual proportion, variety, sensory richness, belonging color, etc. The analysis of commercial spaces as collective spaces where most of the social events of Iranian life took place reveals many undeniable formal, conceptual and functional features. The set of these social activities has caused that in order to

establish these activities in the required spaces, a special order is made in the market in order to accommodate this important factor, and the behavior of the city's people in the markets has changed from its usual state to just buying and selling. to become a huge and wide collective stage of collective activities in which the market and the audience of the stage (people and marketers, etc.) formed a single entity and lived social life side by side. The main and center of the bazaar complex play an important role in the formation of this collective life, but the body of the bazaar itself has also been unavoidable in adapting to the lifestyle and social activities of Iranians. It is the era of the corona epidemic. In this sense, the present research is proposed in order to answer the following two basic questions: How do the qualitative components of an open and semi-open space affect people's social interactions in Bam Landt commercial space? Which of the components of spatial quality in open and semi-open spaces has the greatest effect on increasing social interactions between people during the Corona epidemic?

2. Materials and Methods

2.1. Methodology

In order to achieve the main goal of the research, which is to improve the quality of space in open and semi-open spaces in Bamland in order to increase social interactions and complete the necessary information, a survey-type descriptive-analytical method has been used. The method of collecting information was library and field research. The tool used to collect the necessary information was a questionnaire. According to the visitors of Bamland, which is an average of 500 people per day, and according to Cochran's formula, the sample size was 310. Questionnaires were distributed completely randomly among the people present in Bamland, which were distributed on different days of the week and at different hours among users in Bamland with different age and gender spectrum, to express their opinion regarding the influence of spatial quality on interactions. and finally, 310 questionnaires were analyzed by Pearson correlation tests and linear regression in SPSS software. In the present research, Bamland complex of Tehran was investigated due to the more suitable condition of open space and recreational and sightseeing facilities compared to other complexes. This research was carried out in the semi-open open spaces of Bamland and specifically in the recreational spaces of Bamland, which by selecting places with different social, economic and physical structures and completing questionnaires in them, identified and evaluated the influential components in social interactions.

2.2. Corona pandemic as a risk

Space, environment and spatial form is the product of social, economic, cultural and political processes (Lefebvre, 1991, Ziari, 2013: 97 and Hateminejad and Qahrai, 2015: 33). It can be said that the city was the place of modernity experience (Berman, 2009 and Tajbakhsh, 2006: 31) and the place of production and presentation of its achievements and is influenced by them (Ziari, 2012: 151). The dangers that are fundamentally different from the threats and dangers of the pre-modern era (Qasemi et al., 1391:18). There are different perceptions of danger and risk. "The concept of "danger" is the consequence of society's great concern about adapting to the dangers of modern life" (Imani Jajrami, 2007: 127).

Therefore, any society that has followed the process of modernization, and wants to adapt itself to the principles of modernity, must accept that it will face new risks. In another sense, "danger" is produced from the uncontrollable situations of modernity. The story of risk is a comic story. According to Socrates, "man's awareness that he knows nothing." Man does not know what dangers he will face in the future (Beck, 2006:329). In other words, the risk of the systematic method is to face the dangers and insecurities that are produced by means of modernization (Beck, 1999: 21). This concept is different from the similar word's "danger" and "at risk" (Giddens, 1999, Mythen, 2004)

The possibility of creating weak social ties is at the foundation of [urban] social networks (Granovetter, 1973) and the stranger - as a representative of the "missing link" - is an empty node that may create and participate in a weak link. The flow of information Weak social relations are

very important in the flow of information across social networks (Granovetter, 1973; Granovetter, 1983:229). Weak ties represent the possibility of interacting with social actors outside of one's everyday circles. According to Granovetter, 1983:220), weak relationships (acquaintances) of a person are less related to each other. Therefore, weak ties offer the possibility of communication between smaller social groups composed of stronger ties. It can be argued that in terms of a viral epidemic in urban areas, weak social ties could potentially become loops that facilitate the spread of viral infections – similar to the flow of information. Block et al. (2020) have shown that reducing the number of contacts and remaining in a social bubble can reduce the risk of contracting COVID-19. Citizens may feel familiar with each other due to shared values and customs. Just living in a city creates invisible bonds with other citizens. The urban public space provides space for interaction between different factions of society (Gehl, 2011). Public space can be seen as a place where citizens become part of a larger group by interacting with weak and absent ties. In this light, government interventions (such as quarantine) are an attempt to minimize the likelihood of an individual interacting with weak and/or absent relationships. The purpose of these preventive measures is to limit the space of urban social networks, which in turn minimizes close contact between different groups. It can be argued that identifying and isolating strong relationships is not challenging as a preventive measure. However, interacting with strangers adds a degree of randomness that makes systematic isolation strategies difficult.

2.3. Open space

To understand the concept of space, two main components of space must be distinguished. These two components, one is the space itself and the other is its recognizable range. Therefore, architectural space can be referred to as the space of sensory perception, which is observed by its recognizable range, and if there is no range, it will not be visible (Pourdihemi 24:1378). Open space in early houses in order to provide security and create privacy. It was private and secluded in the center of the house. The open space is often considered as public and semi-public spaces, and only the private courtyard of the open space is private at the same time, which is referred to as "private courtyard". On the other hand, the heart of each neighborhood was dedicated to an open space, which was a place for interactions and social relations of the residents of the neighborhood, so that it is referred to as the second courtyard. Therefore, in addition to private courtyards, the presence of public courtyards in residential neighborhoods increases people's sense of belonging. In addition to providing light and ventilation to indoor spaces and natural ventilation, residential open space is an opportunity to connect more with nature and a place for social interactions. Considering the limitation of the interior space of residential units and the traditional history of the presence of the courtyard in Iranian life, open space is an opportunity to expand the function of the interior space and its relationship with the exterior space. The open spaces between the residential buildings are the basis for the connection of the residents with nature and the place to escape from the everyday life. The residential open space is a kind of crystallization of the nature of collective life (Einifar and Ghazi zadeh, 2019: 32). The set of living activities in the rooms can be transferred to these private spaces by opening the doors and windows. In addition, during the spring and summer nights, the soldier's spaces overlooking the yard are also used a lot for sleeping. Thus, at the same time, the life experience could be carried out in a closed and open space consecutively, and it is such that in such a combination of open and closed spaces, the resident of the house could expand his activities and get a sense of freedom and experiences. have more variety to carry out their activities (Hairi, 2008: 122).

According to the definitions provided, open space is a space between inside and outside, which does not have a roof cover, and its range is defined by natural or artificial components, and its quality is determined by the form and proportions of the surrounding components. On the other hand, the perception of this space takes place under the influence of the five senses and sets of mental variables and schema. With the help of these spaces, the interior and exterior spaces are integrated, connected and expanded. Open space

can play the role of transition between inside and outside or be a center for residents' activities. On the other hand, the role of geographical-environmental-social-cultural factors has caused the formation of different types of open spaces in different parts of the country. Due to the fact that the terms open and semi-open spaces include many examples in architecture, thirty examples of such spaces have been discussed in order to clarify the topic. The substrate studied in the current research was Bamland of Tehran.

2.4. Semi-open space

Semi-open (covered) spaces are a type of volume joints that in some cases make a smooth transition from one realm to another possible. In the past, these spaces have been prominent not only in the overall independent organization, which played a role in various functions based on the open and closed spaces, but also as an almost accepted space. These spaces have characteristics of both groups of open and closed spaces (Mahmoudi, 2011:63) They also cause a gradual transition from one field to another; So that the border between different fields is not hard and obvious and is defined in the most subtle way possible. (Ayanfar.et.al, 2008:15) In terms of structure, this space is a whole unit composed of two components or two equal and opposite forces, closed and open, or in other words inside and outside. The boundary between the closed and open spaces surrounded by it in an analytical study can be known as the connecting space between the two and the semi-open space. In addition to the mentioned cases, semi-open spaces create spatial diversity and improve the quality of the space. Also, being in these spaces makes people, while establishing a closer relationship with nature, enjoy the comfort of the climate and are safe from the adverse rays of the sun or rain and snow. (Fig. 1)

2.5. Components affecting the effective use of space

One of the missions of designers and architects is to create a suitable relationship between people and their surrounding bodies. To achieve this goal, space creators must have a correct understanding of human behavior in different environments; in a way that makes the bond between man and place stronger. Many researchers are trying to discover the influencing factors on users' evaluation of environmental satisfaction. In this regard, several variables affecting the evaluation of users have been examined (Behzadfar. 2012:16) according to the studies, theories and researches that are related to the target area, that is, the qualitative characteristics of spaces, or from its results can be used in this context, which is briefly introduced in the following table, and in the following table, the components that are used in the space environment, according to the researches, have been extracted. (Tab.1)

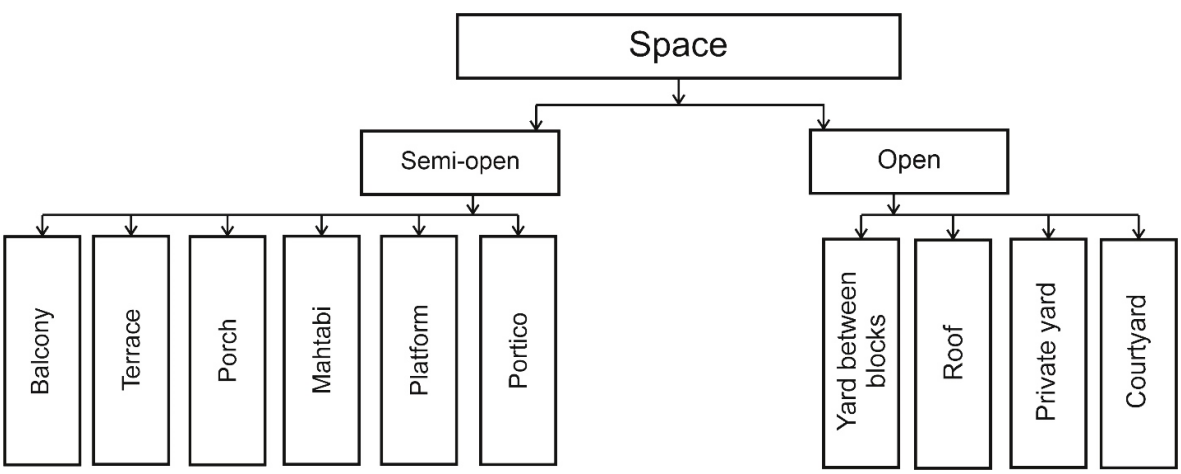

Figure 1: Classification of types of space (source: Rahab and Nazari, 2013: 41)

Table 1. Components, criteria and sub-criteria of the research

Component	*criteria*	*sub-criteria*
Physical	Access and movement	Accesses from the street to the open space
		Number and access to parking lots and parking lots
		Access from closed space to open and semi-open space
		Spatial transparency of routes
		The dimensions are proportional to the number of contacts of the main traffic
		Guidance of movement paths
		The number of entries according to the size of the audience
		Entrance to various open, semi-open and closed spaces
		Attractiveness in walking paths
	Furniture	Visibility of furniture
		Number of furniture
		Access and path to furniture in open and semi-open spaces
	Climatic comfort	Suitable outdoor shades
		Green spaces and gardens and trees in open and semi-open spaces
	Separation of privacy and public	Usability of designed public spaces
		Separation of leisure and business space
	visual perception	Necessary visual proportions in the design of facades
		Design of walls and bodies in open and semi-open spaces
		Lighting at night and outdoor and semi-open advertising boards
Functional	Scale	Proportions and height differences in open and semi-open spaces
		Human dimensions and scale
		Height difference and sky line of building mass in open space
		dimensions and proportions of public spaces such as (amphitheatre, cinema,
		Proportions and dimensions and size of stairs and railings and design platforms
	Predicting attractive activities	Performing street arts (theatre, music, gallery, etc.) during the Corona era in the open air
		Lake water recreation in the era of Corona pandemic
	Spatial complexity and diversity	Use according to the needs of the audience
		Holding group and religious activities in the era of Corona pandemic
		suitable open and semi-open spaces for leisure time such as library and park
		Placement of open and semi-open commercial and recreational spaces
		The location of the complex next to Chitgar Lake
	Spatial hierarchy	Spatial hierarchy and movement from open space to semi-open space and
	Sociable spaces	Cafes and semi-open commercial and recreational spaces
		Children's park and play space that can be used in Corona era
	Health protocols	Attention to health protocols during the Corona era
Semantic	Using all the senses	Curiosity and discovery of other spaces
		Vitality and dynamism
	Social interactions	Organized social interactions
		Random social interactions

2.6. Social interactions

Social interaction means creating a relationship between two or more people that leads to a reaction between them, and this type of reaction is known to both parties. Therefore, relationships without meaning are not included in this definition. Of course, there are other definitions for social interactions, for example, social interaction and communication can be a physical issue, a look, a conversation and communication between people, which itself requires the definition of appropriate events and activities, and as a result, the role of people in the space and Their membership is in social groups and networks (Danshpour and Chaharchian, 2016: 22). The processes of globalization and neo-liberalization have been the key factors behind the theories of socio-spatial relations. These theories shed light on the way these processes change global, national, regional and local relations (Jessop et al., 2008). In particular, these theories focus on attempts to decipher broad transformations of socio-spatial relations (see Harvey, 2001; Jameson, 1991; Jessop et al., 2008; Passy, 2004; Soja, 2003). At the scale of the city, such theories pay attention to the spatial, economic and social transformations caused by globalization and neo-liberalization (Ferguson and Gupta, 2005:111; Jessop et al., 2008:398.) However, by focusing on a larger scale and understanding the state and the city as fundamental entities, these studies leave their rich and complex internal spatial dynamics underdeveloped. The global city-state axis is not limited in scale to reveal the interrelationships between urban social spaces within the city itself. Thus, existing theories lack the deep application of insights evolved from spatial rotation to better understand the socio-spatial relationships of small-scale urban dwellers. The combination of functions and activities in architectural places to create spatial unity is considered the main platform in social interactions. "Architectural collective spaces play an essential role in increasing the interactions of citizens (Keshfi et al. 1391:17.)

3. Discussion and Findings

3.1. Date analysis

After entering the data into SPSS software (version 21), the data were analyzed. First, the descriptive characteristics of the data have been examined using frequency distribution, as well as graphs and central and dispersion indices. Then the normality of the data is checked and the type of statistical test is determined. And then the research hypotheses have been tested for confirmation or rejection by suitable inferential tests. Cronbach's alpha for the questionnaire with 37 questions is above 70%. Therefore, the questionnaires in question have acceptable reliability.

Investigating the normality of the data using skewness and kurtosis indices

According to the table below, we can see that the value of skewness and kurtosis for all variables is between two values (-2, +2). Therefore, the assumption of normality of the data can be accepted and parametric tests can be used for the inferential analysis of the data. (Tab.2)

3.2. Examining research objectives

The first objective: investigating the impact of access and movement variables, furniture, climatic comfort, separation of privacy and public, visual image, meaning in open and closed space.

To predict the impact of each of the independent variables of access and movement,

Table 2. Skewness and kurtosis indices to check the normality of the data

Indexes	Abundance	Average	The standard deviation	Skewness amount	Kurtosis amount
Access and movement	310	3.1495	.37459	-.013	.528
Furniture	310	2.4022	.70769	.632	.581
Climatic comfort	310	3.6355	.62008	-.506	.230
Separation of privacy and public	310	3.1194	.55618	.014	1.080
Visual image	310	3.4968	.53348	.192	1.431
Semantic	310	3.6081	.77820	-.483	.124
Functional	310	3.3230	.30831	.047	.522

furniture, climatic comfort, separation of privacy and public, visual image, meaning as independent variables on the functional variable as dependent variable, step by step regression test is used. This regression initially removes access and movement variables due to having a very weak relationship. The operation of the step-by-step method is such that from the very beginning, the variables that have the least impact are removed from the regression model. In the following, the desired test presents the best model for predicting the variable. Therefore, two hypotheses are presented as follows:

- H_0: non-significance of the effect of independent variables on the dependent (significance level ≤ 0.05).
- H_1: The significance of the effect of independent variables on dependent variables (significance level >05).

The following table summarizes the characteristics of the best regression model presented in stepwise regression. According to the table below, the Watson camera statistic for the formed models is equal to 1.86, which is an acceptable value (between 1 and 2). For this model, the predictor variable is semantic variables, visual perception, furniture, climatic comfort, and separation of privacy and public. The value of the multiple correlation coefficient is (R=0.671), which is a value close to 1 and strong. Therefore, there is a strong correlation between predictor and criterion variables. According to the squared value of the correlation coefficient (0.450), the predictor variable plays a role in explaining the variance of the criterion variable. In other words; The desired model can fit the data. (Tab.3)

The following table shows the variance analysis test related to step-by-step regression. For the model in question, the F value indicates whether the regression model of the research is a suitable model or not. According to the value of F in the table below, which is equal to 49.727, it has become significant at the error level of less than 5%, which means that the predictor variables have high explanatory power and are able to explain well the amount of variance changes of the criterion variable. Therefore, according to the results of regression test and analysis of variance, hypothesis H0 is rejected and hypothesis H1 is accepted. (Tab.4)

3.3. Regression line equation

According to the table below, at an error level of less than 5%, only variables are included in the line equation that have a significance level of less than 5%. Therefore, for the desired model, which is the most important and the best model, the width from the origin is equal to 1.441. On the other hand, the tolerance value is close to 1 and the VIF values are also significantly far from 2. Therefore, the equation of the regression line of the desired model will be as follows.

Functionality = 1.441+0.164* (meaning) +0.155* (visual perception) +0.09* (furniture) +0.099* (climate comfort) +0.056* (separation of privacy and public)

Table 3. Regression model summary

R	The square of the correlation coefficient	Adjusted coefficient	Estimated standard deviation error	Durbin-Watson Test
0.671	0.450	0.441	0.23054	1.838

Table 4. Analysis of variance test for the regression model

Analysis of variance						
Model		Sum of squares	Degrees of freedom	mean square	F	Significance level
5	regression	13.215	5	2.643	49.727	0.000
	left over	16.157	304	0.053		
	Total	29.372	309			

The contribution of predicting independent variables from predicting the functional variable includes furniture (3.3%), climatic comfort (6.9%), separation of privacy and public (2.7%), visual image (107%) and semantic (21.1%). Also, the prediction share of all variables is equal to 45%. (Tab.5)

3.4. The Second objective: investigating the relationship between access and movement variables, furniture, climatic comfort, separation of privacy and public, visual image, meaning with open and closed space in pairs.

Due to the normality of the data related to the variables, Pearson correlation is used. Therefore, two hypotheses are defined as follows:

- H_0: non-significance of the relationship between independent and dependent variable. (0.05sig ≤)
- H_1: The significance of the relationship between independent and dependent variables. (<0.05 sig) (Tab.6)

According to the Pearson correlation coefficient test and with the help of the table above, it can be seen that at an error level of less than 5%, the significance level of the Pearson correlation test for all variables is less than 5%. Therefore, the two-by-two relationship of all the independent variables with the functional dependent variable is a meaningful and positive relationship in such a way that the correlation coefficient between the independent and dependent variables is as follows: access and movement 0.298, furniture 0.165, climatic comfort 0.349 The separation of privacy and public is 0.270, the visual image is 0.400, and the meaning is equal to 0.512. Therefore, hypothesis H_0 is rejected and hypothesis H_1 is accepted for all relationships.

5. Result and Conclusion

Considering the importance of Tehran's Bamland complex and considering its special features during the Corona epidemic period and their important role in promoting social

Table 5: Regression model coefficients

Models	Not standardized coefficients		Standardized coefficients	t	Significance level	Correlations			Tolerance	VIF
	B	Standard deviation error	Beta coefficient			Zero order	Separation	Semi-segregated		
Constant	1.441	.129		11.129	0.000					
Semantic	0.164	0.018	0.414	9.221	0.000	0.512	0.468	0.392	0.898	1.113
Visual image	0.155	0.026	0.269	6.091	0.000	0.400	0.330	0.259	0.929	1.076
Furniture	0.090	0.020	0.205	4.491	0.000	0.165	0.249	0.191	0.864	1.157
Climatic comfort	0.099	0.023	0.199	4.215	0.000	0.349	0.235	0.179	0.814	1.228
Separation of privacy and public	0.056	0.026	0.100	2.142	0.033	0.270	0.122	0.091	0.826	1.211

Table 6: Pearson correlation test to express two-by-two relationship between independent variables and functional dependent variable

		Access and movement	Furniture	Climatic comfort	Separation of privacy and public	Visual image	Semantic
Functional	Pearson correlation	0.298	0.165	0.349	0.270	0.400	0.512
	Significance level	0.000	0.004	0.000	0.000	0.000	0.000
	Abundance	310	310	310	310	310	310

interactions, in this research, the role of these centers in promoting social interactions was investigated. In this direction, the influential factors in improving the level of social interactions during the Corona era were analyzed. According to the investigations, the attitude, spatial layout and open and closed spaces and the arrangement of the spaces next to each other have a direct effect on the way the spaces are used, and it represents meaningful social relationships, and on the other hand, the connection of the spaces with each other is a positive point in the direction of improvement in the complex. The results show that the link that is created between the spaces and the context of the users' contact and the promotion of social interactions and as a result of sociability in this era. Examining the communication parameter also shows that the collective spaces of the furniture used in this collection, due to the dividing role they play, become the basis for better and more social interactions and communication and increase communication during the Corona epidemic. In relation to the environmental component, the indicators of accessibility and climate comfort furniture, separation of privacy, visual and semantic image have a significant relationship on the environment, also the path coefficient obtained for these indicators was positive, which shows the positive effect of these indicators on the environmental component.

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