



THE EFFECTS OF INTERIOR DESIGN IN OPEN OFFICES ON EMPLOYEE'S MOTIVATION

Kubulay Çağatay^{1*}, Kemal Yıldırım², Nurettin Gökbulut², Tolga Subaşı³

¹Department of Furniture and Interior Design, Incirli Vocational High School, Keçiören, Ankara, Turkey
kubulaycagatay@hotmail.com

²Department of Furniture and Decoration, Gazi University, Ankara, Turkey
kemaly@gazi.edu.tr, gokbulutnurettin@gmail.com

³Department of Art and Design, ANKÜ Private Anatolian Vocational High School, Gölbaşı, Ankara, Turkey
tolga_subasi_@hotmail.com

Received: 26.12.2016, Accepted: 16.05.2017

doi: 10.22531/muglajsci.281432

*Corresponding author

Abstract

This document contains paper format of In this study, it has been aimed to determine the effects of interior design characteristics in open-plan offices on users. For this purpose, the Forestry Regional Directorate and Forestry Operations Directorate buildings, which are located in Ankara, have been chosen as the study environment for work motivation. A motivation questionnaire, which was composed of 2 sections and 16 questions, has been applied to 71 employees using open offices. Of the users who participated in the study, 40.85% were females and 59.2% were males. When the results of the interviews were reviewed in general, it has been observed that 39.4% of the users were not satisfied with the open office working environment, 43.7% were not satisfied with the open office interior design and 40.8% stated that the open office environment negatively affects relations with other persons. Moreover, it was determined that males were taken into account more compared to females when making known their opinions about office design and comfortable working in the office environment.

Keywords: Open office, Work motivation, Interior design, Equipment element.

AÇIK OFİSLERDE İÇ MEKAN TASARIMININ ÇALIŞANLARIN MOTİVASYONU ÜZERİNDEKİ ETKİLERİ

Öz

Bu araştırmada, açık ofislerin iç mekan tasarım karakteristiklerinin kullanıcıların çalışma motivasyonu üzerindeki etkilerinin belirlenmesi amaçlanmıştır. Bu maksatla, Ankara'da bulunan Orman Bölge Müdürlüğü binası araştırma ortamı olarak seçilmiş olup, bu binadaki açık ofisleri kullanan 71 personele 2 bölümden ve 16 sorudan oluşan bir motivasyon anketi uygulanmıştır. Araştırmaya katılan kullanıcıların %40,8'ini kadınlar ve %59,2'sini ise erkekler oluşturmaktadır. Araştırma anketlerinden elde edilen sonuçlara genel olarak bakıldığında, kullanıcıların %39,4'ünün açık ofis çalışma ortamından ve %43,7'sinin ise açık ofis iç düzeninden memnun olmadığı, yine %40,8'inin açık ofis ortamının diğer kişilerle olan ilişkilerini olumsuz yönde etkilediğini bildirdiği görülmektedir. Ayrıca, ofisin düzenlenmesinde fikirlerine başvurulması ve ofis mekanının rahat çalışabilmesi açısından düzenlenmesi bakımından erkeklerin kadınlara oranla daha fazla dikkate alındığı belirlenmiştir.

Anahtar Kelimeler: Açık Ofis, Çalışma Motivasyonu, İç Mekan Tasarımı, Donatı Elemanı.

1 Introduction

"Office" is the name given to a space that is structured within the framework of a certain activity or duty for persons (employees) and furnishings (work machinery, equipment elements, etc.). Generally, these duties and activities, just as they are of different types and at different levels of difficulty or complexity, also require information on different storage and forms of transfer. These differences are in the lead of the important factors, which should be taken into consideration in the determination of the needs and the type of office (open-plan and closed-plan office types) [1,2].

The proposed benefits of open-plan offices have been mentioned by many researchers [3-6]. The original claims of the designers of open-plan offices were that they created flexible spaces, allowing an office floor's layout to be more sensitive to changes in organizational size and structure. It was also believed that the absence of internal physical barriers would facilitate communication between individuals, which would then consequently improve morale and productivity [7,8].

Although many claims have been made regarding improvements in communication and productivity through the use of open-plan office designs, some other studies have reported negative findings, such as lower levels of visual or/and acoustic privacy and an increase in distractions and interruptions [4,6,9-15], and decreased employee performance [16,17]. Empirical research supports the theory of over-stimulation as a partial explanation of these negative effects of open-plan offices. Office workers generally seek to minimize unwanted intrusions and potential sources of excessive stimulation in their workspace. Accordingly, they are dissatisfied when an open-plan design does not allow for these desired working conditions [18,19]. Maher and von Hippel [20] have examined the independent and joint influences of stimulus screening, inhibitory ability, perceived privacy and task complexity on the perception and performance of employees working in open-plan offices, finding that satisfaction and performance is reduced for those employees with poor stimulus screening, poor inhibitory ability, low perceived privacy, or complex tasks.

Besides the technological, economic, sociological, etc. developments in becoming widespread and in the development of offices, the concepts of "satisfaction of the employees" and "motive/motivation" are in the forefront for human beings. Motive is defined as the intrinsic force that prompts the actions and behaviors of the individual, that is, as the intrinsic and extrinsic forces in the environment of the organism, which provide energy to the behavior. Motivation is called an individual's direction to behavior for the intrinsic force to become ready [21]. In the study by Tümgan [22], motivation was defined as the forces activated for a certain objective, which are oriented in the direction of the desired behaviors of individuals. The objectives of motivation are:

- To provide for the employees to remain at the business enterprise.
- To provide for the employees to use their creative hidden forces.
- To provide for the employees to increase their work successes.

When human beings join a business enterprise, it brings with it certain requirements, which affect the success in the workplace to the business enterprise. Some of these requirements are related to physiological values, whereas, some others are related to psychological and social values. These are constituting significant factors in providing for the motivation of the employees at the institution [23]. For those employed in an office to find a motivationally suitable environment, just as it can be extremely beneficial in overcoming the needs and reaching the objectives for the employees, it would also be under consideration that the objectives of the business enterprise would be in harmony with the objectives of the employees and thus, while the employees are continuing their activities in the direction of the objectives of the business enterprise, they would provide benefits both for themselves and also for the business enterprise.

In the rapid industrialization of the present-day, due to many negative factors, such as lack of education and business enterprises keeping the human factor in the second plan, employees have become confronted with the threat of losing their productive capabilities by becoming worn out [24]. Ergonomics, from this aspect, is based on making working conditions suitable for human beings. It has been researched within a humanistic concept for the adaptation of the human personality within a short period of time to a changing environment by examining the psychological and physiological aspects and by increasing human productivity in complicated working conditions. The humanistic concept can be explained with the analysis of the factors, which affect the organization of the working conditions in accordance with human objectives and by examining it from the psychological, biological and social aspects of human beings [24].

The satisfaction and motivation of employees working in offices where they spend approximately 8-10 hours per day can only be provided with the treatment at an optimum level of the person-equipment elements and the human-environment relations. The anthropometric attributes that should be taken into consideration in the relationship between humans and equipment are envisaged as being within harmony as measurement and shape in the areas of activity where the users establish physical relations. Conforming to the user measurements in the dimensions of equipment elements and their placement in interior spaces are important steps in the fulfillment of ergonomic factors. The anthropometric measurements follow the material attributes of the equipment elements [25,26]. Materials and textures suitable to their

functions should be selected by taking into account user comfort and health. It is necessary to solve these physical attributes in the implementation of office design as well as environmental and psychological factors, the required illumination, heating and acoustical problems.

Business enterprises have started to form offices composed of broader and complex spaces with the increase in demand and fields of work and a large number of users are employed in these offices. Besides these, the development and replacement of technologies and the development and differentiation of the system carried out with a commercial work volume has been the cause for a search for new definitions that would respond to the new requirements in the existing office organizations [27].

The satisfaction and motivation of the employees could be an important reference in the classification and definition of the daily work forms that pass within an office and in the organization of the space. The areas of activity required to be set aside for representatives, who provide contact with the authorized persons, secretaries, jobholders and other employees of the office space, could basically display differences from each other. Different statuses could be created with the quality and color differences of the materials used in interior spaces. Besides these differences, the office interior space elements and placement should be suitable for human measurements and movement capabilities. An optimum design is required of all of the elements and areas of circulation, which constitute the working space by taking into account anthropometric measurements [27].

There is a tendency in office design towards offices that could meet the requirements of individuals for raising the satisfaction and motivation of employees to the optimum level. The intellectual behavior within the organization could shape the design or the changes in the working environment. It is such that just as there are scientists who feel an interest in a planned organizational change in offices, there are also significant meanings within businessmen [27].

Definition of the problem: Together with the developing technology, offices have become spaces that put to the test the performances of employees within the scope of health and motivation problems stemming from the work environment. Offices, with the environmental factors and the equipment elements in these spaces, should be designed by taking into consideration ergonomic criteria with the purpose of increasing the performances and productivities of the users by providing a comfortable, healthy and secure working environment.

According to the designers, the open office systems, which play a major role in the contemporary office designs, should be suitable for individual work as well as suitable for good communications and teamwork. Furthermore, it is necessary to design spaces that are suitable for users and that are anthropometric and environmentally ergonomic.

It is observed that work productivity cannot be attained at the desired level and that there are physical and psychological health problems stemming from a lack of the attributes for which a need is felt, due to the fact that the required environmental attributes for work satisfaction and motivation cannot be provided in the present-day offices. It would be beneficial to determine definite standards in this direction by analyzing the open office systems within these limitations and in the development of suggestions for solutions. The attributes of the equipment elements (measurements, materials, colors, textures, etc.) and the environmental attributes (temperature of the space, noise level, illumination, etc.) of the space affect work productivity and performance of the users.

Hypothesis of the Research: It is thought that in open office systems, the interior space environmental factors occurring, such as environmental factors (temperatures, sounds, smells, lights, etc.) and the design factors (architectural plans, colors, materials, dimensions, etc.) have a positive/ negative effect on the motivation and satisfaction of employees.

In this study, the environmental and design factors of the open office spaces taken within the scope of the research were examined and it was attempted to determine whether or not there were effects of the genders on the employees in the open office environment. Accordingly, the open offices located in the Ankara Forestry Operations Directorate and the Ankara

Forestry Regional Directorate buildings were included within the scope of the research and the situations of motivation and satisfaction of the employees in an open office environment were measured with the help of a questionnaire.

2 Research Methods

2.1 Research Setting

In this study, the office buildings of the Ankara Forestry Regional Directorate and the Ankara Forestry Operations Directorate were treated (Figure 1) and the situations of motivation and satisfaction related to the open office spaces of the personnel working in the offices and the characteristics of the office spaces were determined.



Ankara Forestry Regional Directorate



Ankara Forestry Operations Directorate

Figure 1. Views of the Ankara Forestry Directorate buildings.

The Ankara Forestry Regional Directorate building is 4 stories high and the working environment located on the stories has been organized according to the open office system. All of the work in both buildings is carried out at desks. A desk type in the shape of an "L" is used in the open offices. Two "L" shaped

desks have been organized by bringing together two side-by-side, that is, in the shape of a "+" (Figure 2). The dimensions and attributes of the materials used in the interior equipment elements found in the open offices on which the study was made have been given in Table 1.



Ankara Forestry Regional Directorate



Ankara Forestry Operations Directorate

Figure 2. Views of the open working offices at the Ankara Forestry Directorate building

Table 1. Materials used in the interior equipment elements and dimensions of the equipment elements

Attributes of materials	Ankara Forestry Operations Directorate	Ankara Forestry Regional Directorate
Floor covering	Laminate parquet	Carpet
Wall covering	Cream-colored paint	Cream-colored paint
Ceiling covering	Plaster panel suspended ceiling	Rock wool suspended ceiling
Desk	White birch melamine-coated chipboard	White birch melamine-coated chipboard
Heights of panels	100 cm	140 cm
Dimensions of file cabinets	80x30x190 – 80x30x120	80x30x120

2.2 Data Analysis

The data were obtained from the subjects selected with the sampling method from among the personnel working in open offices. Two each office buildings were treated as the extent of the sampling. The data were obtained in two different manners, such as implementing a questionnaire and documenting with photographs.

2.3 Questionnaire Design and Practice

The questionnaires previously found to be valid and reliable in the research studies made by Çelebi [25], Yıldırım et al. [2,28], the Ministry of Health [29] and Yılmaz [30] were utilized in the design of the questionnaire. The questionnaire form was categorized in two groups. The first part was composed of questions related to the general knowledge of the office employees. Whereas, the second part was composed of questions for the evaluations of employees related to motivation and satisfaction in open office spaces.

The data of the research were obtained from the employees using open offices located at the Ankara Forestry Regional Directorate and the Ankara Forestry Operations Directorate office buildings. The data of the research was obtained in 2016 from 71 employees with the help of a questionnaire. The questionnaires were implemented at different times of the day during the week for a period of one month.

2.4 Statistical Evaluation

The percentage values of the data obtained in the research were calculated and the Chi Square (X^2) test was used to determine whether or not there were statistically significant relationships between the dependent and independent variables (at the level of $p < 0.05$).

3 Results

In the study, the Ankara Forestry Regional Directorate and the Ankara Forestry Operations Directorate office buildings were treated and the situations of motivation and satisfaction related to the office spaces by the working personnel in the office spaces were determined with the help of a detailed questionnaire. Furthermore, the characteristic attributes of the open office spaces found in these buildings were determined and their photographs were taken. The findings obtained in the research have been given below in a systematic order.

Of the employees who participated in the research, 40.8% were females, 38% were between 20-35 years of age, 21.2% were between 36-45 years of age and 40.8% were 46 years of age and older. The results for the evaluations of motivation for the employees working in open offices have been given in Table 2.

Table 2. Evaluations of motivation for the employees working in open offices

Evaluations of Motivation for the Employees Working in Open Offices		Yes		Undecided		No		Total	
		n	%	n	%	n	%	n	%
My opinion is obtained on the arrangements for my working environment and conditions.	Female	-	-	8	11.3	21	29.6	29	40.8
	Male	6	8.5	17	23.9	19	26.8	42	59.2
My open office working environment has been arranged in a manner in which I can work easily.	Female	4	5.6	4	5.6	21	29.6	29	40.8
	Male	12	16.9	12	16.9	18	25.4	42	59.2
I am feeling myself safe/secure in the open office.	Female	8	11.3	8	11.3	13	18.3	29	40.8
	Male	17	23.9	15	21.1	10	14.1	42	59.2
Protective security precautionary measures have been taken in the open office where I work.	Female	5	7.0	9	12.7	15	21.1	29	40.8
	Male	13	18.3	16	22.5	13	18.3	42	59.2
The management gives rewards for the motivation of the employees (thank you notes, supplementary payments, etc.).	Female	3	4.2	3	4.2	23	32.4	29	40.8
	Male	3	4.2	7	9.9	32	45.1	42	59.2
The management produces solutions together with the personnel on the negativities for motivation of the employees.	Female	5	7.0	4	5.6	20	28.2	29	40.8
	Male	6	8.5	18	25.4	18	25.4	42	59.2
I can convey easily to the managers the problems with which I am confronted.	Female	7	9.9	13	18.3	9	12.7	29	40.8
	Male	14	19.7	17	23.9	11	15.5	42	59.2
The management takes into consideration my suggestions on the subject of the operations of the section in which I work.	Female	4	5.6	9	12.7	16	22.5	29	40.8
	Male	8	11.3	20	28.2	14	19.7	42	59.2

It can be observed in Table 2 that 56.4% of the females and males working in open offices stated that their opinions were not applied in the arrangements made for the working environment and working conditions, that 55% stated that the working environment was not arranged in a manner where it would be easy to work, that 32.4% stated that they did not feel themselves safe/secure in an open office, that 39.4% stated that protective security precautionary measures were not taken in the working environment, that 77.5% stated that the reward mechanisms for the employees by the management were not operating, that 53.6% stated that the management did not produce solutions together with the related personnel for the negativities on the subject of the motivation of personnel, that 28.2% stated that they could not convey easily to the managers

the problems that they confronted and 42.2% stated that their suggestions on the subject of the operation of the section in which they worked were not taken into account sufficiently. On the other hand, the Chi Square test was used to determine whether or not there was a statistically significant difference at the level of $p < 0.05$ for the evaluations of motivation by the females and males working in open offices. Accordingly, the following was determined in female and male open office employees:

- There was a significant difference in obtaining the views on the arrangements made for working environment and working conditions ($X^2: 7.201$; $df: 2$; $Sig.: 0.027$) and as a result, the views of males were taken more compared to females;

- There was a significant difference in the arrangement of the working environment in a manner in which they could work easily ($X^2: 6.053$; $df: 2$; $Sig.: 0.048$) and as a result, the working environment was arranged in a manner in which males could work more easily compared to females;
- A significant difference was not found in feeling oneself safe/secure in open offices ($X^2: 3.499$; $df: 2$; $Sig.: 0.174$) and as a result, there was no effect of gender on feeling oneself safe/secure in open offices;
- A significant difference was not found in taking protective security precautionary measures in the working environment ($X^2: 3.392$; $df: 2$; $Sig.: 0.183$) and as a result, there was no effect of gender on taking protective security precautionary measures in the open office;
- A significant difference was not found in operating reward mechanisms for the employees by the management ($X^2: 0.716$; $df: 2$; $Sig.: 0.699$) and as a result, there was no effect of gender on the operating of reward mechanisms for the employees;
- There was a significant difference in the management producing solutions together with the personnel for the negativities on the subject of the motivation of personnel

($X^2: 6.958$; $df: 2$; $Sig.: 0.031$) and as a result, males were supported more in the cooperation for motivation by the management compared to females;

- A significant difference was not found in being able to convey easily the problems confronted to the managers ($X^2: 0.710$; $df: 2$; $Sig.: 0.701$) and as a result, there was no effect of gender on being able to convey easily the problems confronted; and
- A significant difference was not found in taking into consideration the suggestions on the subject of the operation of the section in which the employees worked ($X^2: 3.372$; $df: 2$; $Sig.: 0.185$) and as a result, there was no effect of gender on taking into consideration the suggestions on the subject of the operation of the section in which the employees worked.

The results related to the evaluations of satisfaction by the employees working in open offices made in the study have been given in Table 3.

Table 3. Evaluations of satisfaction by the employees working in open offices

Evaluations of Satisfaction of the Employees Working in Open Offices		Yes		Undecided		No		Total	
		n	%	n	%	n	%	n	%
It makes no difference to me whether I work in an open or closed office.	Female	9	12.7	9	12.7	11	15.5	29	40.8
	Male	20	28.2	11	15.5	11	15.5	42	59.2
An open office interior arrangement positively affects motivation.	Female	12	16.9	11	15.5	6	8.5	29	40.8
	Male	16	22.5	12	16.9	14	19.7	42	59.2
I am not satisfied with an open office working environment.	Female	12	16.9	13	18.3	4	5.6	29	40.8
	Male	16	22.5	16	22.5	10	14.1	42	59.2
I am not satisfied with the arrangement of the open office interior equipment elements.	Female	15	21.1	9	12.7	5	7.0	29	40.8
	Male	16	22.5	16	22.5	10	14.1	42	59.2
The open office interior arrangement negatively affects my relations with other persons.	Female	13	18.3	10	14.1	6	8.5	29	40.8
	Male	16	22.5	12	16.9	14	19.7	42	59.2
When I enter an open office from outside, it positively affects my psychological condition.	Female	10	14.1	9	12.7	10	14.1	29	40.8
	Male	16	22.5	12	16.9	14	19.7	42	59.2

It can be observed in Table 3 that of the female and male personnel who work in open offices, 40.9% stated that it made no difference whether it was an open or closed office environment, 28.2% stated that the open office interior space arrangement did not affect motivation positively, 39.4% stated that they were not satisfied with the open office working environment, 43.6% stated that they were not satisfied with the arrangements of the open office interior equipment elements, 40.8% stated that the open office interior arrangement negatively affected their relations with other persons and 36.6% stated that when they entered an open office from outside, it positively affected their psychological condition. On the other hand, the Chi Square test was used to determine whether or not there was a statistically significant difference at the level of $p < 0.05$ for the satisfaction evaluations of females and males working in open offices. Accordingly, the following was determined in female and male open office employees:

- A significant difference was not found for noticing whether or not they were working in an open or closed office environment ($X^2: 2.061$; $df: 2$; $Sig.: 0.357$) and as a result, there was no effect of gender on working in an open or closed office environment;

- A significant difference was not found for motivation by being positively affected by an open office interior space arrangement ($X^2: 1.484$; $df: 2$; $Sig.: 0.476$) and as a result, there was no effect of gender on the open office interior space arrangement;
- A significant difference was not found for situations of satisfaction from an open office working environment ($X^2: 1.110$; $df: 2$; $Sig.: 0.574$) and as a result, there was no effect of gender on satisfaction an open office working environment;
- A significant difference was not found for situations of satisfaction from an arrangement of open office interior equipment elements ($X^2: 1.323$; $df: 2$; $Sig.: 0.516$) and as a result, there was no effect of gender on an arrangement of open office interior equipment elements;
- A significant difference was not found for the positive/negative relations with other persons by the open office interior arrangement ($X^2: 1.357$; $df: 2$; $Sig.: 0.507$) and as a result, there was no effect of gender on the positive/negative relations with other persons by the open office interior arrangement; and

A significant difference was not found for the psychological condition of being positively/negatively affected when entering

an open office from outside ($X^2: 0.103$; $df: 2$; $Sig.: 0.957$) and as a result, there was no effect of gender on the psychological effects formed when entering an open office from outside.

4 Conclusion and Suggestions

In this research, the Ankara Forestry Regional Directorate and the Ankara Forestry Operations Directorate office buildings were taken within the scope of the study. The situations of motivation and satisfaction for the office spaces of the personnel working in open office spaces were determined with the help of a detailed questionnaire. In conclusion, the results obtained from the findings and the suggestions developed according to these conclusions have been treated respectively below.

It was determined that of the females and males working in open offices, 56.4% stated that their views were not obtained in the arrangements made for the working environment and working conditions, 55% stated that their working environment was not arranged in a manner in which they could work easily, 32.4% stated that they did not feel themselves safe/secure in open offices, 39.4% stated that protective security precautionary measures were not taken in the environment in which they worked, 77.5% stated that the reward mechanisms for employees by the management were not operating, 53.6% stated that solutions were not produced by the management together with the related personnel for the negativities on the subject of the motivation of personnel, 28.2% stated that they could not convey easily to the managers the problems that they encountered and 42.2% stated that their suggestions on the subject of the operation of the section in which they work were not taken into account sufficiently by the management. Furthermore, the views of males in the arrangements made for the working environment and conditions were taken into account more that the working environment was arranged in a manner in which they could work easily and that cooperation for motivation by the management was supported more compared to females. Accordingly, it was observed that there would be a major benefit in not making discrimination between genders in the arrangement of the open office working environment for motivation of the working personnel, in the formation of a comfortable and safe/secure environment, in the operations of reward mechanisms and in acting within cooperation with the management.

It was determined that of the females and males working in open offices, 40.9% stated that they did not have a preference for an open or closed office working environment, 28.2% stated that the open office interior space arrangement negatively affected motivation, 39.4% stated that they were not satisfied with the open office working environment, 43.6% stated that they were not sufficiently satisfied with the arrangement of the open office interior equipment elements, 40.8% stated that the open office interior arrangement negatively affected their relations with other persons and 36.6% stated that their psychological condition was positively affected when entering the open office from outside. Accordingly, there would be a major benefit in obtaining the views of the employees on the subjects of working in an open or closed office environment, on the open office working environment and on the arrangement of the internal space for the satisfaction of the working personnel.

From the conclusions given above, it understood that the open office environments positively/negatively affect the motivation, satisfaction and psychological conditions of the employees and that connected to this, usually a systemic problem emerges that decreases productivity. It is of great

importance from the aspect of employees to take these data into consideration in the design of office environments.

5 Acknowledgement

This study was presented as an oral presentation at the 2nd International Furniture Congress, 13-15 October 2016, Muğla, Turkey. We would like to extend our deepest gratitude to Pınar Arı for the valuable contributions she made in the collection and classification of the data used in this study.

6 References

- [1] Pulgram, W.L. and Stonis, R.E., *Designing the Automated Office: A Guide for Architects, Interior Designers, Source Planners and Facility Managers*, Whitney Library of Design, New York, 9-11, 1984.
- [2] Yıldırım, K., Akalın-Başkaya, A. and Çelebi, M., "The effects of window proximity, partition height and gender differences on perception of open plan offices" *Journal of Environmental Psychology*, 27(2), 154-165, 2007.
- [3] Brennan, A., Chugh, J. and Kline, T., "Traditional versus open office design, a longitudinal field study" *Environment and Behavior*, 34, 279-299, 2002.
- [4] Cangelosi, V. E. and Lemoine, L.F., "Effects of open versus closed physical environment on employee perception and attitude", *Social Behavior and Personality*, 16, 71-77, 1988.
- [5] Hedge, A., *Open versus enclosed workspaces: The impact of design on employee reactions to their offices*, In J. D. Wineman (Ed.), *Behavioral issues in office design* New York: Van Nostrand Reinhold Co., pp. 139-176, 1986.
- [6] Sundstrom, E., Herbert, R. K. and Brown, D.W., "Privacy and communication in an open-plan office", *Environment and Behavior*, 14, 379-392, 1982.
- [7] Allen, T.J. and Gerstberger, P.G., "A field experiment to improve communications in a product engineering department: The nonterritorial office", *Human Factors*, 15, 488-498, 1973.
- [8] Zahn, L.G., "Face to face communication in an office setting: The effects of position, proximity and exposure." *Communication Research*, 18, 737-754, 1991.
- [9] Block, L.K. and Stokes, G.S., "Performance and satisfaction in private versus nonprivate work settings", *Environment and Behavior*, 21, 277-297, 1989.
- [10] Brookes, M.J. and Kaplan, A., "The office environment: Space planning and affective behavior", *Human factors*, 14, 373-391, 1972.
- [11] Burgess, M.A., Lai, J.C.S., Eisner, M. and Taylor, E., "Speech privacy in open-plan offices-post occupancy", In *Proceedings of the 25th annual conference of the Ergonomics Society of Australia: Ergonomics, technology & productivity*, pp. 351-354, 26-29 November 1989.
- [12] Jackson, T.S., Klein, K.W. and Wogalter, M.S., "Open-plan office designs: An examination of unattended speech, performance and focused attention", In *Proceedings of the human factors and ergonomics society, 41st annual meeting: Ancient wisdom future technology*, pp. 509-513, 1997.
- [13] Marans, R.W. and Speckelmeyer, K.F., "Evaluating open and conventional office design", *Environment and Behavior*, 14, 333-351, 1982.
- [14] Mercer, A., "Office environments and clerical behavior", *Environment and Planning*, 6, 29-39, 1979.
- [15] Vischer, J.C., *Environmental quality in offices*, New York: Van Nostrand Reinhold, 1989.
- [16] Becker, F.D., Gield, B., Gaylin, K. and Sayer, S., "Office design in a community college", *Environment and Behavior*, 15, 699-726, 1983.

- [17] Oldham, G. R. and Brass, D.J., "Employee reactions to an open-plan office: A naturally occurring quasi-experiment", *Administrative Science Quarterly*, 24, 267-284, 1979.
- [18] Oldham, G.R. and Rotchford, N.L., "Relationships between office characteristics and employee reactions: A study of the physical environment", *Administrative Science Quarterly*, 28, 542-556, 1983.
- [19] Sundstrom, E., Burt, R.E. and Kamp, D., "Privacy at work: Architectural correlates of job satisfaction and job performance", *Academy of Management Journal*, 23, 101-117, 1980.
- [20] Maher, A. and von Hippel, C., "Individual differences in employee reactions to open-plan offices", *Journal of Environmental Psychology*, 25, 219-229, 2005.
- [21] Wikipedi Dijital Ansiklopedi (Wikipedia Digital Encyclopedia), 2016. Date of Access: 24 July 2016 (<https://tr.wikipedia.org/wiki/G%C3%BCd%C3%BC>).
- [22] Tümgan, C., "Kamu Örgütlerinde Motivasyon ve İş Tatmini (Job satisfaction and motivation in public organisation)". *Master's thesis* project, Kahramanmaraş Sütçü İmam University, Institute of Social Sciences, Department of Business Administration, Kahramanmaraş (in Turkish, abstract in English), 2007.
- [23] Öztürk, Z. ve Dünder, H., "Örgütsel motivasyon ve kamu çalışanlarını motive eden faktörler (Organizational motivation and the factors which motivate the public workers)", *Cumhuriyet University, Journal of Economic and Administrative Sciences*, 4(2): 57-67, 2003. (in Turkish, abstract in English).
- [24] Kalınkara, V., 9. Ulusal Ergonomi Kongresi Bildiri Kitabı (Proceedings of the Ninth National Ergonomics Congress). Pamukkale University, Denizli Vocational School of Higher Education, Denizli, 1-2, 2003. (in Turkish).
- [25] Çelebi, M., "Açık ofis sistemlerinde çevresel faktörlerin çalışanların mekansal algılarına etkileri üzerine bir araştırma" (A study on the effects of spatial perceptions of employees on the environmental factors in open office systems). *Master's thesis*, Gazi University, Institute of Sciences, Department of Furniture and Decoration, Ankara (in Turkish), 2005.
- [26] Yıldırım, K. and Hacıbaloglu, M., "Konut mutfakları ile ilgili ergonomik bir araştırma (An ergonomic study on kitchens in housing)", Gazi University, *Journal of the Institute of Sciences*, 13(3): 549-566, 2000. (in Turkish).
- [27] Stallworth, J.O.E. and Kleiner, B.H., "Recent developments in office design", *Journal of Facilities*, 14 (1/2): 34-42, 1996.
- [28] Yıldırım, K., Capanoglu (Özkan), A. and Çağatay, K., "The Effects of Physical Environmental Factors on Students' Perceptions in Computer Classrooms", *Indoor and Built Environment*, 20: 5, 501-510, 2011.
- [29] Hidayetoğlu, M.L., Yıldırım, K. and Çağatay, K., "The effects of training and spatial experience on the perception of the interior of buildings with a high level of complexity", *Scientific Research and Essays*, 5 (3), 2010.
- [30] Sağlık Bakanlığı (Ministry of Health), *Çalışan Memnuniyeti Anketi* (Questionnaire on Employee Satisfaction), Questionnaire No: 1620, 2016. (in Turkish).
- [31] Yılmaz, G., "Açık ofislerin iç mekan çevresel faktörlerinin kullanıcıların algısal değerlendirmeleri üzerindeki etkilerinin tespit edilmesi (Determination of the effects on the perceptual evaluations of users of the internal space environmental factors of open offices)". *Master's thesis*, Gazi University, Institute of Sciences, Department of Woodworking Industrial Engineering, Ankara, 2016. (in Turkish).