

A model proposal for university campuses in the context of inclusive design

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Abstract

Urban public spaces should be shaped according to the need as they occupy an important place in urban development. The campuses serve as a small city due to the facilities and social environment they have and thus emerge as important public spaces. Campus areas affect our attitudes towards education and should be tailored to the needs and designed to cover all campus users. As a modern design approach, the inclusive design philosophy; To create quality spaces by increasing the livability and quality of university campuses as a public space, and to spread this philosophy to the whole society in their professional lives by ensuring that this design concept is placed on university students, who are the main campus users, who will provide the development of the society. It is to determine the problems faced by the users in the university campuses, research the approaches and examples that will allow all users to access the campus equipment, use this equipment as they wish, and develop solutions for the problems encountered. This study aims to create an evaluation model to create an inclusive campus environment. The creation of the checklist, which was prepared as a priority, as detailed in the field study. The field study continued with the implementation and results of the checklist in the selected Davutpaşa campus. The fieldwork carried out in the Davutpaşa campus was divided into four categories: psycho-social arrangements, administrative arrangements, outdoor and indoor physical arrangements.

Keywords

Architectural design, Inclusive design, Campus climate, Universal design.

1. Introduction

The public spaces of the city, where the social relations of members of the society take place intensively, occupy an important place in urban development. The cultural, economic, and technological conditions in constant change and development, as well as the understanding, needs, and use of public spaces are affected by this situation.

The philosophy of inclusive design as a modern design approach; The main objectives of this research are to create quality spaces by increasing the liveability and quality of university campuses as public spaces and to spread this philosophy throughout the society, by placing this design concept on university students in their professional lives, who are the main campus users, and who will ensure the development of society.

Public spaces of the city should be shaped according to the need of the populace, as they occupy an important place in urban development. The campuses serve as a small city due to the facilities and social environment they have and thus emerge as important public spaces. Campus areas affect our attitudes towards education and should be tailored to the needs of, and designed to cover, all campus users.

University campuses, with their urban equipment, sociocultural environment, and user diversity, are important public spaces in the case of small city examples. Campus areas affect our attitudes towards education. Although very few designers are now designing campuses by adopting human-centred design, this nonetheless needs to be included in the whole process. Human-centred designs begin by taking into account the needs of students and educators who are actual campus users, enabling the field to support learning transformation.

The inclusive environment is unhindered in order to ensure equal opportunities and participation by all. Design is more than form and function; it is about changing people's perceptions and how such impressions interact with the environment. An obstacle that prevents people from fully taking part in society is based on the interaction between the individual

and the built environment. People of different abilities, sizes, and ages must be able to fully participate in society independently. Inclusive Education begins with teaching tolerance for those who are different within one's own environment and covers a large spectrum of individual differences such as age, gender, and ability/disability as well as ethnic, cultural, linguistic, and religious background (Hick et al., 2009; Lunt, & Norwich, 2009; Florian, 2009; Fredericson & Cline, 2009; Kugelmass, 2004).

'Climate' at a university campus is a term used to refer to how individuals and groups experience the environment within the campus community. This is a general term that summarises the organisation's dynamics of inclusiveness and the extent to which various stakeholders are involved or excluded. Since the conversations about climate are naturally concerned with the real and perceived realities of different groups, this idea always includes social identities defined in terms of race, ethnicity, gender, sexuality, disability, and an unlimited spectrum of other aspects (Williams, 2010).

The campus climate results in a diversity of individuals of different backgrounds. On the other hand, climate expresses the experience of individuals and groups on campus and the nature and scope of the interactions among these various groups and individuals. In other words, the campus climate is an important and necessary component of a comprehensive plan for diversity. To form the basis of a learning community, the primary mission of the academy should be to create an environment that fosters diversity and understands difference.

2. Inclusive campus climate

The historical context in the campus climate includes research into the inclusion or exclusion of different groups in campus culture, traditions, and policies. The structural or compositional dimension expresses the number of various groups present and, in many respects, affects the psychological and behavioural dimensions; in short, it shows how individuals behave and perceive the campus environment. Structural

diversity represents the true representation of different groups on a campus. The psychological dimension is related to how much individuals feel belonging or excluded and the behavioural dimension is affected and represents the interaction between different groups.

Studying campus climate and culture is an important part of campus-based conceptual assessment. A culture of data-driven approach is adopted to create a more comprehensive campus environment. When campus climate research is well done, an equal environment will be created for the campus community, faculty, staff, women, minorities, LGBT community members, and others.

The university brings together individuals from different sociocultural settings. At the same time, the university contributes to the personal and intellectual development of individuals and serves as a field of socialisation. Universities create vitality with their social, cultural, economic, and spatial effects.

It is an undeniable fact that the social and cultural environment in the university gives differences to the perspectives of individuals. The campus environment, where people from different ideas come together and find opportunities to socialise, accommodates many cultures. Zhang et al. (2017) argued for the design education aim should be transferred from design solution centered to human-centered. Our future younger designers should not think from themselves but have a holistic understanding of people. The inclusive design concept and thinking should be merged into design education aim. For example, we can state “to cultivate future designers more concern about diverse human capabilities and various human needs”.

Inclusive design refers to products and areas that are available to everyone. There is a misconception that inclusive design is often associated with accessibility for the disabled or the aging population. In fact, inclusive design not only addresses the needs of people with disabilities but also includes various target groups such as children, families and the aging population (Imrie, 2012).

Psychological and behavioural dimensions are often the focus of most of the campus climate research. When the psychological dimension of the

campus climate is mentioned, it is perceived how individuals perceive (a) the conflict and discrimination on campus, (b) the background or (c) institutional support/commitment to diversity. Behavioural dimensions of campus climate, interactions between different groups; reports on participation in activities (or lack thereof) and full participation in various systems of the organisation (Williams, 2010).

Since inclusive buildings serve a purpose that meets a variety of needs, the shape-to-function approach should be adopted. The form-following function is a design principle invented by Louis Sullivan, which means that the shape of the building is determined by internal activities or purpose (Week 13, 2018). Rather than seeking information from people's cognitive minds, they are provided with environmental perceptions and insights guided by motivation and previous experiences (Steinfeld & Maisel, 2012). Therefore, the architecture of the extensively designed structures should indicate the purpose of the building to provide information for the benefit of the user by the administration.

Built-in forms should communicate in built-in buildings because this understanding facilitates security and usability for everyone. Buildings usually consist of rooms with interrelated functions. According to Roth, there are four types of functions in architecture: pragmatic, circulatory, symbolic and psychological; inclusive buildings should transmit psychological and circulatory function, which is the creation of appropriate spaces to regulate and direct movement from one area to another (Roth, 1993).

The physical form of campuses is one of the most important factors in creating a positive first impression of an institution among prospective students (Boyer, 1987; Griffith, 1994; Thelin & Yankovich, 1987). In the basic layout of the campus, the quality of the open spaces, the accessibility of parking spaces and living rooms, and the design of buildings such as libraries or student clubs come to the fore.

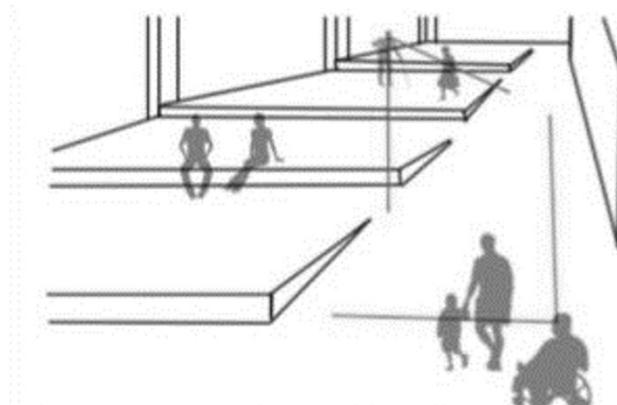
The impact of the physical environment on behaviour can be conceptualised. The physical environment

may be the source of opportunities or may affect the likelihood of some behaviour. For example, having a convenient and attractive collection area at the core of the campus increases students' socialisation on campus; or having off-campus sports facilities may reduce the likelihood of using the facilities. Although the characteristics of the campus physical environment include theoretically all possibilities, the layout, location and arrangement of spaces and facilities may make some behaviours more likely and more likely than others. The recent and developing concept of inclusive education aims to provide equal opportunities to students with diverse abilities in a shared school environment. Inclusive education at schools creates the challenge of comprehensive institutional reformations and demands adaptations in physical school environments as a form of urban space diversity. Schools are being challenged to review their curriculum, organizations, pedagogical structures in order to fulfill the requirements of inclusion (Erkilic, 2012).

Vehicle-pedestrian distinctions have an important place in campus planning. As a result of the movement within a macro-scale environment, people perceive and recognise this environment as both physically and psychologically salient. This movement can be thought of as pedestrian-oriented because, when a person walks around, they can get to know their environment in the best way and communicate with other people and objects. In recent urban designs, it is observed that pedestrian-scale urban spaces, which are free of motor vehicles, are given priority to pedestrians. While this pedestrianisation operation is carried out in the regions within the existing city, this principle is very important in the newly established cities or parts of the city. In this context, when examining university campuses, an important feature is that; This means that a student can move between two extreme faculties in a 10-15-minute period between two courses (Kortan, 1978).

The impact of university campus design can be understood from a pedestrian perspective (Banning, 1993). A good campus not only provides a

Figure 1. *Creating a social space from the circulation area (Wong, 2014).*



safe, convenient, and enjoyable walking paths for pedestrians but also adds to the feeling of being involved in the walking experience, i.e., the feeling of space and learning (Strange & Banning, 2001). The harmony in the architectural design of the buildings and the landscape of the campus can enhance the feeling of the place. In addition, a legible campus spatial structure can increase the likelihood that students will engage in a variety of intellectual activities on campus. Locating the main library with an accessible entrance on the main pedestrian path can encourage students to enter the building and use its resources.

However, among the many methods used to promote learning, the use of the physical environment is perhaps the most neglected feature. As can be seen in Figure 1, it is possible to create a social environment from the circulation areas and provide interaction. The combination of circulation and social spaces has a beneficial effect.

As well as being part of the urban environment, the campuses have an urban area with their functions, landscape, circulation areas, and landscapes. In this context, environmental perception can be mentioned in order to express the perceptibility of the campus. When the campus structures are evaluated from this perspective, the campuses constitute a perception with their education - housing - recreation - sports units, green spaces and circulation areas. Another phenomenon that has an important place in the perceptibility of the campus is circulation. As a result of human movement in the environment, people perceive visual, physical and psychological.

A good perception of the campus environment can be achieved by planning the circulation in the best way. In addition, movement detection, which is the main element of circulation, becomes even more powerful (Cinar, 1998). The campus transportation system is not limited to transportation elements.

The most important feature of inclusive campus interiors is circulation and consequently good orientation. In addition to architectural design, pathfinding is also effective in communicating and meeting various needs. Pathfinding is defined as a variety of ways to navigate by people to become familiar with their environment (Nussbaumer, 2012). Pathfinding is considered to be another form of communication system integrated into buildings designed as inclusive. Each floor is given an identity and is presented with a signage system to improve people's experiences. Routing is also important because it creates identity within the building.

Combining multiple senses seeking clues to construct a mental map through perception in extensively designed buildings ultimately creates situational awareness driven by previous experiences (Steinfeld & Maisel, 2012). Sound, light, colour and texture function have an impact on the quality and availability of inclusive buildings.

As understood from the literature study the university brings together individuals from different socio-cultural environments, contributes to the personal and intellectual development of individuals and serves as a field of socialisation. The concept of inclusive design has emerged to ensure that individuals benefit equally from all opportunities. The inclusive environment ensures equal opportunities and participation. Inclusive design is not only an architectural problem, but also a political, economic, social and technological issue. Inclusive campus Climate is a term used to discuss how individuals and groups experience the environment in the campus community. The students with various disabilities, who were seen as one of the most disadvantaged groups in society, faced the problems of educational marginalization and exclusion in their learning environment. A demand for a new paradigm that would improve

both the special education and existing education systems has resulted in a shift of value systems in educational institutions from segregation to inclusion (Erkilic, 2012).

The campus climate includes the diversity of individuals and their experiences and communication between individuals. The campus environment should be the place where all individuals, with or without disabilities can receive education together. It is a social responsibility for individuals with disabilities to receive a better education, and it is necessary to provide solutions in order to prevent the right of individuals with disabilities to improve their education and to revise their educational structures projects in this respect. In the campus environment, the cultural environment is directly related to the behavioural and psychological environment. The psychological dimension of the campus environment is related to discrimination and diversity on campus. The behavioural dimension is related to the interaction and socialisation environment between different groups. As the physical environment may be the source of some opportunities or may affect the likelihood of some behaviour, campus building is an important factor for inclusiveness. Although the characteristics of the campus physical environment theoretically include all possibilities, the layout, location, and arrangement of spaces and facilities can make some behaviours more likely and more likely than others. The campuses create a perception with their work, education, shelter, sports units, green spaces and circulation areas. Another phenomenon that has an important place in the perceptibility of the campus is circulation. As a result of human movement in an environment, the environment is perceived visually, physically, and psychologically. In the case of creating accessible environments that can be used by everyone, the integration of circulation spaces and social spaces is more ideal for sustaining social interaction.

3. A case study

With the comprehensive design approach, the status of all users' access to and use of the campus areas was evaluated with the checklist created and the questionnaire extracted from this list.

The campus design checklist created within the scope of the doctoral thesis contributed to the literature as an original study.

In the selection of Yıldız Technical University Davutpaşa Campus,

- the demand for the university,
- the diversity and surplus of the user profile,
- the recent reconstruction of the campus planning,
- the ongoing construction of new buildings in line with the needs,
- the urgent solution of the regulations in the campus area,

brought by rapid developments in terms of the inclusive design concept were among the important factors.

This study includes physical arrangements in the field, data collection through on-site observations, and evaluation in the context of the created checklist. Photographing the data obtained includes identifying problems and opportunities through technical observation. The checklist created in the study area was taken into consideration. As a result of the literature study, questions were created for the inclusive campus environment; items required for the campus environment were formed from the questions in the existing checklists. In order to make better observations during the study, a questionnaire was designed from the checklist and a questionnaire was administered to academic staff, administrative staff, and students. The results of this survey were drawn up with the statistical package program and interpreted.

The framework prepared for the campus environment is as follows: In this context, the campus environment was examined under three main headings. University campuses have been examined conceptually, managerially, and

physically, and the checklist prepared in the field study section was formed according to the components of inclusive campus environment design (Table 1).

These sections are designed to be applicable to each university campus in order to be under the same roof as the Inclusive University Campus Environment segment in Section 2 (selected as the sample area investigation of Davutpaşa campus). All open areas of the Davutpaşa campus have been examined and Faculty of Arts and Sciences building and Faculty of Electrical and Electronics building have been examined. In the selection of the refectory and library buildings, it was recognised that these were important common areas to be used by all students and staff living in the campus. The selection of the Faculty of Science and Letters, as well as the Faculty of Electrical and Electronic were quite important given the high number of students studying in these faculties. For this reason the fact that the surveys were too high in these faculties and that the buildings were built for this campus later than the others.

The questionnaire applied in the field study was produced from the questions in the checklist. In the context of inclusive design, the students and administrative and academic staff working at Davutpaşa campus were surveyed face to face and on the internet to represent their main masses. The deficiencies and qualifications of the Davutpaşa campus were evaluated and the results of the quantitative research were analysed using two-step clustering analysis, chi-square independence test, factor analysis and t test for independent samples.

The questionnaire administered to the students was conducted using a face-to-face-interview method; respondents were asked to answer each question

Table 1. *Inclusive campus environment components.*

Conceptual Environment			
Cultural Environment	Social Environment	Psychological Environment	
Administrative Environment			
Inclusion Objective and Perception	Economic Factors	Legislation on Inclusive Design	Accreditation
Physical Environment			
Interior Space		Outdoor Space	

Table 2. Open field and structures clustering analysis position variable results.

			Position			Total
			Student	Administrative	Academic	
Open Field	TwoStep Cluster Number	Count	78	7	13	98
		1 % within Position	34,80%	70,00%	41,90%	37,00%
		Count	74	1	6	81
	2 % within Position	33,00%	10,00%	19,40%	30,60%	
	Count	72	2	12	86	
	3 % within Position	32,10%	20,00%	38,70%	32,50%	
Total	Count	224	10	31	265	
	% within Position	100,00%	100,00%	100,00%	100,00%	
Structures	TwoStep Cluster Number	Count	128	1	10	139
		1 % within Position	47,60%	6,70%	25,60%	43,00%
		Count	141	14	29	184
	2 % within Position	52,40%	93,30%	74,40%	57,00%	
	Count	269	15	39	323	
	% within Position	100,00%	100,00%	100,00%	100,00%	

Table 3. Open field and structures clustering analysis experience variable results.

			Experience		Total
			1-4 year	4+ year	
Open Field	TwoStep Cluster Number	Count	60	38	98
		1 % within Experience	33,00%	45,80%	37,00%
		Count	61	20	81
	2 % within Experience	33,50%	24,10%	30,60%	
	Count	61	25	86	
	3 % within Experience	33,50%	30,10%	32,50%	
Total	Count	182	83	265	
	% within Experience	100,00%	100,00%	100,00%	
Structures	TwoStep Cluster Number	Count	105	34	139
		1 % within Experience	47,10%	34,00%	43,00%
		Count	118	66	184
	2 % within Experience	52,90%	66,00%	57,00%	
	Count	223	100	323	
	% within Experience	100,00%	100,00%	100,00%	

carefully. The personnel survey was conducted on the Internet using the Survey-monkey platform system. The obtained data tables were uploaded to the statistical package program in Excel-file format and necessary statistical analyses were performed.

Seven demographic variables were identified and analysed according to these variables. These variables were po-

sition (student-staff), experience (1–4 years, 4+ years), faculty (Faculties of Science, Literature, Electrical Electronics, Construction, Chemistry Metallurgy, Education, Economics and Art Design), gender (male-female), disability status (exist-none), disability type (orthopaedic, vision, hearing, neurological and other disability types), graduation (high school, associate, university, graduate).

The questionnaire was applied to 384 students and 75 staff. Although a questionnaire was sent to all personnel via the Internet, only 75 of them were returned. The questionnaire was applied to 459 people in total; there were 23 disabled people. Four of the participants are in orthopaedic disabilities, seven were visually impaired, one was hearing impaired, one had a neurological disability, and 10 of them are in the other disability group.

3.1. Clustering analysis in the context of open spaces – physical arrangements

Questions about open areas were included in the cluster analysis. As a result of clustering analysis, it was determined that three clusters had good decomposition; the participants were divided into three groups. In clustering analysis, the distinction of clusters was made according to the scores given in the questionnaire. The answers to the survey questions were coded as follows: 1 (Very low), 2 (Low), 3 (Medium), 4 (More), 5 (Too much). Of the clusters formed as a result of clustering analysis, the questions included in the first cluster analysis were between 1.00 and 2.50 points (dissatisfied), 2. Cluster 2.50 and 3.50 points (moderately satisfied) consisted of those whose responses derived a score between 3.50 and 5.00 (satisfied). The following cluster distribution table shows the cluster profiles.

Clustering analysis was performed using questions about open spaces and structures/physical arrangements. Cluster profiles obtained as a result of the research were determined according to position, experience, faculty, gender, disability status, disability type, and graduation variables.

When the answers given to the physical competence questions in open spaces were evaluated according to the po-

sition variable (Table 2), 34.8% of the students were in the dissatisfied group, 33% were in the most satisfied group, and 32.1% were in the middle group. 70% of the administrative staff were in the dissatisfied group, 10% in the satisfied group, 20% in the middle group. 41.9% of the academic staff were in the dissatisfied group, 19.4% in the most satisfied group, 38.7% in the middle group. While 70% of the administrative staff were in the dissatisfied group, 34.8% of the students were in the dissatisfied group. The majority of the academic staff appeared in the dissatisfied and middle groups; the percentage in the most satisfied group was low (19.4%). It was seen that the students were distributed almost equally to the groups and the percentage between the dissatisfied and the satisfied group was very close to each other. When the general population was examined, it was seen that the majority (37%) were in the dissatisfied group.

When the answers given to physical competence questions in open areas were evaluated according to the experience variable (Table 3), it was seen that dissatisfaction increased as the years of experience increased. The distribution of clusters in the 1–4 year experience range is close to equality. For those who had more than 4 years of experience, 45.8% dissatisfied group, 24.1% most satisfied group and 30.1% medium satisfied group. Thirty-seven percent of the total was found to be in the dissatisfied group.

When the answers given to the physical competence questions in open spaces were evaluated according to the Faculty variable (Table 4), 66.7% of the Faculty of Art and Design, 42.2% of the Faculty of Construction and 42.6% of the Faculty of Electrical and Electronics were found to be not dissatisfied. With 41.9%, the Faculty of Education was the most satisfied group. The Faculty of Arts and Sciences was in the middle group with 45.2%.

When the answers given to physical competence questions in open spaces were evaluated according to the gender variable (Table 5), it is seen that there is not much difference between men and women. The general attitude was found to be in the dissatisfied group

Table 4. Open field and structures clustering analysis faculty variable results.

			Faculty							Total
			Science Literature	Electric Electronic	Building	Chemistry Metallurgy	Education	Economy	Art and Design	
Open Field	TwoStep Cluster Number	Count	40	20	19	15	12	14	8	98
		1 % within Faculty	23,80%	42,60%	42,20%	34,90%	38,70%	31,10%	66,70%	37,00%
		Count	13	12	11	16	13	15	1	81
	2 % within Faculty	31,00%	25,50%	24,40%	37,20%	41,90%	33,30%	8,30%	30,60%	
	Count	19	15	15	12	6	16	3	86	
	3 % within Faculty	45,20%	31,90%	33,30%	27,90%	19,40%	35,60%	25,00%	32,50%	
Faculty	Total	Count	42	47	45	43	31	45	12	265
	% within Faculty	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	
Students	TwoStep Cluster Number	Count	29	27	11	22	24	25	1	139
		1 % within Faculty	54,70%	44,30%	20,80%	41,50%	60,00%	51,00%	7,10%	43,00%
		Count	24	34	42	31	16	24	13	184
	2 % within Faculty	45,30%	55,70%	79,20%	58,50%	40,00%	49,00%	92,90%	57,00%	
	Count	53	61	53	53	40	49	14	323	
	Total	% within Faculty	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%	100,00%

Table 5. Open field and structures clustering analysis gender variable results.

			Gender		Total
			Female	Male	
Open Field	TwoStep Cluster Number	Count	41	57	98
		1 % within Gender	36,60%	37,30%	37,00%
		Count	32	49	81
	2 % within Gender	28,60%	32,00%	30,60%	
	Count	39	47	86	
	3 % within Gender	34,80%	30,70%	32,50%	
Faculty	Total	Count	112	153	265
	% within Gender	100,00%	100,00%	100,00%	
Students	TwoStep Cluster Number	Count	61	78	139
		1 % within Gender	43,60%	42,60%	43,00%
		Count	79	105	184
	2 % within Gender	56,40%	57,40%	57,00%	
	Count	140	183	323	
	Total	% within Gender	100,00%	100,00%	100,00%

with 37%, in the most satisfied group with 30.6% and in the middle group with 32.5%.

When the answers given to physical competence questions in open areas were evaluated according to the Disability variable (Table 6), it was observed that the type of disability is important (Table 7). 58.3% of the disabled were in the dissatisfied group. 25% of the disabled were in the most satisfied group. 50% of the visually impaired were in the dissatisfied group, 25% in

Table 6. Open field and structures clustering analysis obstacle variable results.

			Obstacle (Y/N)		Total		
			Unimpeded	Disabled			
Open Field	TwoStep Cluster Number	1	Count % within Obstacle (Y/N)	91 36,00%	7 58,30%	98 37,00%	
		2	Count % within Obstacle (Y/N)	78 30,80%	3 25,00%	81 30,60%	
		3	Count % within Obstacle (Y/N)	84 33,20%	2 16,70%	86 32,50%	
	Total	Count % within Obstacle (Y/N)	253 100,00%	12 100,00%	265 100,00%		
	Structures	TwoStep Cluster Number	1	Count % within Obstacle (Y/N)	134 43,40%	5 35,70%	139 43,00%
			2	Count % within Obstacle (Y/N)	175 56,60%	9 64,30%	184 57,00%
Total		Count % within Obstacle (Y/N)	309 100,00%	14 100,00%	323 100,00%		

Table 7. Open field and structures clustering analysis obstacle type variable results.

			Obstacle Type					Total			
			0	Orthopedic	Seeing	Hearing	Other				
Open Field	TwoStep Cluster Number	1	Count % within Obstacle Type	76 34,70%	1 33,30%	2 50,00%	1 100,00%	3 60,00%	83 35,80%		
		2	Count % within Obstacle Type	72 32,90%	0 0,00%	1 25,00%	0 0,00%	2 40,00%	75 32,30%		
		3	Count % within Obstacle Type	71 32,40%	2 66,70%	1 25,00%	0 0,00%	0 0,00%	74 31,90%		
	Total	Count % within Obstacle Type	219 100,00%	3 100,00%	4 100,00%	1 100,00%	5 100,00%	232 100,00%			
	Structures	TwoStep Cluster Number	1	Count % within Obstacle type	124 47,10%	0 0,00%	3 60,00%	0 0,00%	1 100,00%	1 20,00%	129 46,40%
			2	Count % within Obstacle type	139 52,90%	3 100,00%	2 40,00%	1 100,00%	0 0,00%	4 80,00%	149 53,60%
Total		Count % within Obstacle type	263 100,00%	3 100,00%	5 100,00%	1 100,00%	1 100,00%	5 100,00%	278 100,00%		

the middle group, and 25% in the most satisfied group. 66.7% of the orthopaedic disabled people were in the middle group and no one in the satisfied group. The most satisfied group consisted of one visually impaired and two other disabled groups.

When the answers given to the physical competence questions in the open areas were evaluated according to the graduation variable (Table 8), it was

found that the high rate of the dissatisfied group was Associate and University. It is seen that graduate students are equally distributed to clusters.

3.2. Structures-physical arrangements cluster analysis

In the clustering analysis, questions about structures physical arrangements were included. As a result of the clustering analysis, it was determined that two clusters had good decomposition; the participants were then divided into two groups. In clustering analysis, the distinction of clusters is made according to the scores given in the survey. The results of the clustering analysis consisted of those who scored between 2.50 and 5.00 points (satisfied) and those who scored between 1.00 and 2.50 points (unsatisfied). The following cluster-distribution table shows the cluster profiles.

Clustering analysis was performed using questions about structures and physical arrangements. Cluster profiles obtained as a result of the research were sorted according to position, experience, faculty, gender, disability status, disability type, and graduation variables.

When the answers given to the physical competence questions in the structures were evaluated according to the position (unit of study) variable (Table 2), the majority of the administrative and academic staff appeared in the dissatisfied group. Of the administrative personnel, 6.7% were in the satisfied group and 93.3% were in the dissatisfied group. Of the academic staff, 25.6% were in the satisfied group and 74.4% were in the dissatisfied group. 47.6% of the students were in the satisfied group and 52.4% were in the dissatisfied group. It was seen that over 90% of the votes of the administrative staff expressed satisfaction with the structures. Also, the academic staff were generally satisfied with the structures but the distribution of the students was different.

When the answers given to the physical competence questions in the structures were evaluated according to the experience variable (Table 3), the results were more negative in the highly-experienced (dissatisfaction among those with more than 4years experience). 2.

The rate of negativity in the cluster was high: 47.1% of those with experience between 1–4 years were in the satisfied group and 52.9% were in the dissatisfied group. Of those who had more than 4 years of experience, 34% were in the satisfied group and 66% were in the dissatisfied group.

When the answers given to the physical competence questions in the buildings were evaluated according to the faculty variable (Table 4), 92.9% of the Faculty of Art and Design were not satisfied. The majority of the Faculty of Civil Engineering was also dissatisfied (79.2%). On the whole, 57% were not satisfied and 43% were satisfied.

When the answers given to the physical competence questions in the structures were evaluated according to the gender variable (Table 5), this factor was very close to each other in both clusters.

When the answers given to the physical competence questions in the structures were evaluated according to the Disability variable (Table 6), 64.3% of the disabled individuals and 56.6% of the unhindered individuals came out of the dissatisfied group. 100% of orthopedically disabled people were not satisfied. Of the visually impaired were in the satisfied group. Visually-impaired people were more satisfied than physically disabled people: 80% of other disabled people emerged in the dissatisfied group (Table 7).

When the answers given to the physical competence questions in the buildings were evaluated according to the graduation variable (Table 8), the dissatisfaction rate in associate degree, university, and graduate students was higher than the high school. In the general evaluation, while the percentage of dissatisfied was 43%, the rate of dissatisfied was 57%.

3.3. Open areas and structures physical regulation questions personnel factor analysis

In the personnel satisfaction questionnaire, subdimensions were investigated using factor analysis of open spaces and structures physical regulations questions. As a result of factor analysis, five factors explaining all variables were obtained and evaluated. The first factor consisted of the variables related to the

Table 8. Open field and structures clustering analysis graduation variable results.

		Graduation				Total	
		High school	Associate	License	Graduate		
O p e n F i e l d	TwoStep Cluster Number	Count	69	4	13	12	98
		1 % within Graduation	35,90%	50,00%	41,90%	35,30%	37,00%
		Count	61	1	8	11	81
	2 % within Graduation	31,80%	12,50%	25,80%	32,40%	30,60%	
	3 % within Graduation	32,30%	37,50%	32,30%	32,40%	32,50%	
Total	Count	192	8	31	34	265	
	% within Graduation	100,00%	100,00%	100,00%	100,00%	100,00%	
S t r u c t u r e s	TwoStep Cluster Number	Count	110	5	12	12	139
		1 % within Graduation	47,60%	33,30%	30,80%	31,60%	43,00%
		Count	121	10	27	26	184
	2 % within Graduation	52,40%	66,70%	69,20%	68,40%	57,00%	
	Total	Count	231	15	39	38	323
% within Graduation		100,00%	100,00%	100,00%	100,00%	100,00%	

dimensional properties of the space, the second factor consisted of the variables relating to the social space, the third factor was the emergency variables, the fourth factor comprised the variables related to entrances and transportation, and the fifth factor involved all variables related to the circulation areas.

In the first factor, in general, the questions of Group B (structure analysis) came together with the dimensional-physical questions. In the second factor, Group A (open spaces) questions related to social spaces were gathered. In the third factor, questions related to emergencies in Group B questions came together, but this group also participated in the question about the parking area. In the fourth factor, the questions related to the transportation and entrance to the campus and within the campus were gathered. In the fifth factor, the Group A questions included circulation areas and circulation questions within the campus.

According to factor analysis, Factor 1 was the most important campus assessment factor for personnel because of its dimensional characteristics.

3.4. Open areas and structures physical regulation questions student factor analysis

In the student satisfaction questionnaire, subdimensions were investigated using factor analysis of open spaces and

Table 9. Staff and student factor analysis comparison table.

	Staff	Student
Factor 1	Dimensional Properties	Circulation and indoor features
Factor 2	Social places	Social places
Factor 3	Emergency components	Emergency components
Factor 4	Entries and transportation	Entries
Factor 5	Circulation areas	Transportation

structures physical regulations questions. As a result of factor analysis, five factors explaining all variables were obtained and evaluated. The first factor was composed of variables related to circulation areas and indoor characteristics, the second factor was related to social spaces, the third factor related to emergency variables, the fourth factor related to entries, and the fifth factor was related to transportation.

In the first factor, general circulation group questions (Group A; open spaces) and Group B (structure analysis) questions related to circulation and interior features were gathered. In the second factor, questions belonging to Groups A and B, relating to social spaces, were gathered. In the third factor, questions related to emergencies were brought together in Group B questions; however, this group also participated in finding directions. In the fourth factor, questions relating to the entrance of Group A questions and the question about the parking area were gathered. In the fifth factor, transportation questions were gathered from Group A questions on the campus.

According to factor analysis, the most important campus evaluation factor was found to be circulatory and indoor characteristics due to Factor 1 circulation and indoor features. When the factor analysis tables were compared, according to the staff and student satisfaction survey, it was seen that the most important factor for the staff was dimensional characteristics. The most important factors for the student were circulation and interior features. In the Table 9, it was seen that the question groups appeared similar after the second factor. For the staff and students, the second factor social spaces, the third factor emergency components and the fourth factor entries. Table 9, Factor 5 for the differentiated staff in close proximity to each other factor 5 circulation areas, transportation for students has emerged.

4. Discussion

Although the doctoral thesis study of KTO Karatay University, which is examined with photographs, is similar to this study in terms of content, it is divided based on the methods used. In the study, which was carried out only on photographs, a unique checklist was not used, and the results were obtained without conducting a survey (Okten, 2018).

According to the research conducted by Mengi (2019), the expectations of disabled students from the university; to provide equal access to every area (classrooms, washrooms, buildings, cafes, etc.) and information (course materials, library, etc.) in the campus, and to receive services that suit their needs, especially in student affairs. He also stated that they have expectations such as creating environments where they can spend their free time, have fun, rest, socialize and culture, and raise awareness for people with disabilities.

In the study of Pauya and Kocaaslan (2020), to reveal the problems faced by the disabled students at İnönü University on the campus, observations and on-site inspections determined the places that could cause problems for the disabled, and suggestions were developed for the campus to be barrier-free. The questionnaire method and a unique checklist were not used in this study. Within the scope of the study, only the physical environment analysis was made according to the universal design principles.

As a result of the surveys applied to staff and students, when the physical competence questions in open areas were evaluated,

- The distribution of the students in groups was equal,
- The majority of the administrative personnel were in the dissatisfied group,
- While the percentage of academic staff was expected to be higher for the dissatisfied group, the percentage was lower than the administrative staff.
- According to the experience variable, dissatisfaction increased as the time spent on campus increased,
- According to the faculty variable, the most dissatisfied group was the Faculty of Art and Design,
- The majority of the Faculty of Education was in a satisfied group.

- According to the gender variable, while researchers expected women to be more sensitive, there was no significant difference between women and men,
- According to the disability variable, there was a significant difference between the results.
- According to the graduation variable, graduate students were expected to be more sensitive and aware, while they were equally distributed among the groups.

As a result of the questionnaire applied to staff and students, when the physical competence questions in the buildings were evaluated,

- The majority of the administrative and academic staff were in the dissatisfied group,
- Half of the students were in the dissatisfied group,
- According to the faculty variable, it is seen that the Faculty of Art and Design is not satisfied with the structure of more than 90%,
- There was no significant difference between women and men according to the gender variable.
- According to the obstacle situation, the majority did not make a difference, the majority were in the dissatisfied group,
- In terms of graduation, dissatisfaction rates of associate degree, university and graduate groups were higher.

When the overall assessment is made, it is observed that open spaces and structures need to be restructured in order to satisfy the user.

As a result of the survey applied to staff and students, according to factor analysis;

- While social spaces are expected to be the most important factor for students, circulation and indoor characteristics of the most important factor are observed.
- For the personnel, it was observed that the most important factor involved dimensional characteristics, that is, they experienced difficulties in this regard,
- It has been seen that social spaces are the second factor for the student and staff group.
- The fact that the entries are in the

last rankings for the students is not important for them and the features of the spaces are more important.

- While it is expected that the circulation areas will be more important for personnel, it has been revealed that they give more importance to emergency components,
- The most important factor for students was transportation, which means that they did not experience any problems.

When both groups were compared, it was considered that the interior features, circulation areas and dimensional characteristics should be reviewed. The study is an objective study based on statistical data. The context of the original checklist it contains has created a model base for inclusive campus design in the literature.

5. Conclusion

University campuses are defined as the reflection of the land (area and all structures), the academic village or academic ideals established in a green area to the physical planning of the buildings that make up a university, and the social activities that can be integrated into the society by being socialised are also performed.

For this reason, it is evident that university campuses, as with all other public spaces, can be used by everyone on equal terms (and should be considered as spaces designed and implemented with a design approach with unobstructed equipment). Product and physical environments designed according to user profiles such as disabled / disabled, elderly, children, overweight people, very tall or very short people, pregnant women, load carriers other than the average user needs that are the target of general design criteria; It is certain that it will meet the needs of all segments of society due to its inclusive structure.

The concept of inclusive design, which has emerged as the answer to these design concerns, is the design of products, structures and environments that can be used by as large a population as possible, taking into consideration diversity and being accessible. The aim of inclusive design is to design accessible and usable en-

vironments for everyone, regardless of their ability and competence level. It is the essence of the concept of inclusive design to produce products and structural environments that can be used by everyone instead of designs for different needs. To this end, inclusive design principles and guidelines help educate both designers and consumers about more available design solutions.

In the context of the inclusive campus environment design checklist created as a result of the literature review, when designing an inclusive campus environment; circulatory network and landscape integrity should be taken into consideration, inclusiveness should not be ignored in the teaching environment.

When an inclusive design is adopted and planned in the campus design, an environment will be created in which individuals coming to the campus will be strengthened, satisfaction will increase for both employees and students, and social capital and community feeling will be felt more intensely. In line with the surveys targeting the answers to diversity in the university, the university's identity will be strengthened in this way, and it will gain wealth due to the satisfaction of diversity. The inclusive design should aim to create a university environment that embraces everyone.

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