Chapter 2

Planning of University Campus Areas in the Context of Urban Design¹

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Universities are institutions that undertake to raise educated and cultured individuals around the world. These are educational and instructional venues where information is produced and shared with the community in a clear and understandable way. In addition to undertaking educational duties, university settlements are the most effective and special functions in the city with both physical magnitudes and public and social duties. After 2006 in Turkey, the construction of university institutions accelerated and the number of these institutions increased. However, not enough space has been provided for the rapidly increasing number of universities in the city, and in the establishment of universities, the urban areas and the non-urban settlement model emerged. The planning and design of these areas by combining many functions such as education and scientific activities, social and cultural life, shopping and housing in the city or other universities in the city are in terms of architectural and urban environment is very important. When examining the examples in the world, university settlements have different planning models. However, regardless of the morphological structure, the area of the campus expresses a whole with open spaces surrounding buildings and buildings. The use of architectural and urban design principles in the creation of this effective and holistic structure is very important in terms of the quality of the current situation and sustainability. The purpose of this study is to examine the functions and planning principles of campuses.
**Introduction**

Universities in the city we live in are institutions that have had a significant impact on the criteria in social, economic and political life since the past. These important national and global positions of universities make it one of the key institutions that make sustainable development successful at different scales and in all its dimensions. This situation increases environmental and social responsibilities inside and outside the campus, and education and training are seen as the most comprehensive tool in fulfilling these responsibilities.

With the rapidly developing technology, the policies of raising educated and equipped people are increasing their importance in the current period. Universities are at the forefront of educational institutions where qualified manpower is trained, which can set an example for the future of society. The main functions of universities are education and research. However, today's education system of universities requires; work, rest, shopping, entertainment, sports, recreation, health, etc. It should also contain the physical features that will form the basis for the functions. Especially, universities with large landscape areas can easily meet these needs of users with the right landscape planning and design. For this reason, the fact that the campuses that provide physical functions consist of different units, that these functions and units are associated and that they can work as a whole reveals the necessity of planning and this planning in accordance with certain principles. As a result of this requirement, university settlement systems formed by different design principles have emerged and a systematic order has been created for university campuses (Eminağaoğlu and Muhacir 2018).

The main purpose of this study is to develop proposals for the planning and design of university campuses, which occupy a macro-scale in the city, in a way that faculty members, administrative staff, students and other users can interact socially. University campus areas, which are considered as a small city on their own, are they should include the spatial arrangements it needs. In addition to the primary goal of education, it is necessary to create common areas where social and cultural relations will develop in correctly planned and designed campuses (Stramkaya and Çınar 2012).

**1. Campus Definition**

The origin of the word university is based on the word “universitas”, which is the student guild established by Italian students in 1000 AD to hire teachers for themselves. As the equivalent of the word, the Arabs used the name "kulliye" and "camia", while the Ottomans used the name "darülfünun". It is known that the word, which is used all over the world with similar phonetic information, is a
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Universities have been established to provide education, scientific research, publication and consultancy at various levels based on secondary education, to serve the country and humanity in which they are located, with the aim of raising manpower in accordance with the needs of the nation and the country in an order based on modern education and training.

Based on this information; It can be said that the main purpose of universities is to research, produce, transfer and renew knowledge (Anonymous 2017).

The word "campus" means "faculties, institutes, colleges, etc., which have scientific autonomy and public legal personality, and conduct high-level education, scientific research and publications. It is defined as an educational institution consisting of institutions and units”.

From past to present, university campuses have gone beyond this duty, besides the main purpose of education and training, they have turned into a life center where other vital activities such as socialization, cultural and sports activities are carried out, as well as producing science with students and academic staff, providing services with administrators and support personnel. Today, the word campus is defined to include all the buildings within the borders of the university and the whole including the spaces between the buildings and open green areas (Açıkay 2015).

There are four basic aspects that make up university campuses. These;
  a. With the increase in the academic functions of universities, the expansion and growth of the capacities of the units that make up these institutions,
  b. Increasing interdisciplinary relations and the necessity of keeping the units forming the campus close to each other,
  c. The obligation of all users to increase their performance by providing a living environment close to these areas instead of providing access to their work areas from distant locations,
  D. It is the absence of large lands suitable for the establishment of such facilities in urban areas (Açıkay 2015).
University campuses should be established in or near the city center. It has become an important institution in the city to create social, cultural and recreational activity spaces for all users. At the same time, considering the necessity of the use of the people in cultural, social and health activities, it is clear how important the contributions of the campuses are in the city where they are established. Apart from this, it is among the important institutions among the areas where both domestic and foreign tourists want to visit, see and learn.

In order for the university campuses to fulfill their functions in a healthy way, they should be resolved in line with long-term academic plans and the development of the campuses should be ensured by taking these studies into consideration.

2. Campus Planning

Universities are institutions and organizations that take many years to establish and maintain since they have a structure that constantly develops. Campus planning, which is one of the privileged and detailed issues in country planning, is a long-term and costly issue. In the establishment phase of university campuses, the purpose must first be determined. Then, it is necessary to decide on the selection of the right place from the macro scale to the micro scale, to determine and evaluate the land, to decide on the general character of the university, to create an organizational chart, and to prepare growth and sustainable development plans (Yıldızoğlu 2006).

University campuses, which have become a great need and a great opportunity in medium-sized cities, can turn into an activity center and living space throughout the year. With the planning and implementation of the design of the campus areas, a successful university campus with indoor and outdoor recreation area arrangements, a physical environment that can set an example for urban change and development can be created (Yıldızoğlu 2006).

University campuses, which have become a great need and a great opportunity in medium-sized cities, turn into an activity center and living space throughout the year. Therefore, when the efforts to create green areas, recreation and sports areas are considered as a part of the urban landscape, the presence of green areas in urban spaces adds a universal urban feature to the settlements. Open green spaces in campus planning; they fulfill ecological, economic, aesthetic, recreational and psychological functional needs (Aksu and Yılmaz 2018).

University campuses in urban and rural areas significantly affect the urban ecology in terms of their surface area and are important in terms of creating a small climate area on their own. For this reason, structural and plant design studies should be planned and care should be taken (Aksu and Yılmaz 2018).
During the establishment of university campuses, one of the most important issues to be considered in making settlement decisions is to analyze the land and the region well. The shape and width of the land, the climatic conditions of the region where it will be located, the transportation situation, water resources, infrastructure, soil characteristics and the characteristics of the environment where it will be located should be investigated and evaluated very well. In existing campuses, apart from these elements, pedestrian and vehicle traffic, lighting, prominent structures of the campus, places with scenic value and places that allow attractive areas should be taken into consideration (Karakaş 1999).

3. Basic Approaches in University Campus Planning

Campus planning principles and design principles have been the subject of many studies. Researches emphasize that it is important that the designed campus is primarily functional. Planning should be in clear order and buildings should be able to be constructed simply. The spaces between the buildings should be neat, aesthetic, legible and meet the need (Anonymous 2017).

Another research topic is the application of sustainability criteria in university campuses. For example, reuse of rain water and waste water and saving energy, making water and energy efficient plans and designs, constructing green buildings and renewable energy-oriented buildings, increasing the air quality and comfort characteristics in and around the campus, preventing environmental pollution, Sustainability should be ensured through community-oriented designs such as reducing the negative effects of climate change. In this process, a successful campus development is possible with interconnected approaches (Oktay and Küçükyağcı 2015).

In a campus planning, optimum comfort conditions should be provided in the relationship between the user and the space (Yılmaz and Mimar 2016). According to Yılmaz and Mimar (2016), the basic principles in campus planning and design are as follows:

- Cultural values that the campus is included in,
- The student can spend time without getting bored for 5 years,
- University needs program (Faculties, quota, etc.),
- On-campus transportation,
- The relationship between the land structure and the environment where the campus is located,
- Relationships between units forming the campus,
- Flexibility and scalability,
- Benefiting from nature and nature activities,
• Social and cultural environment,
• It is a dynamic structure according to current needs.

Educational units in the campus should be placed by considering the average walking speed and distance criteria of pedestrians.

In our country, although the transportation between university campuses and the city is not at a level that will relieve pedestrians, more attention should be paid to creating a quality and planned campus system that will provide adequate service to disabled pedestrians. Considering the educational and awareness-raising role of university campuses, making the relationship with the city more effective and clearer is an important issue to be considered.

4. Urban Planning Principles in University Campuses

Designing a university campus is also similar to designing a small city. In other words, just as a city includes structural and physical basic living spaces such as shelter, work, rest and transportation, the same functional spaces are created in a system and order in the university campus (Kuyrukçu 2012).

The most important factor affecting the planning and design of a campus is the determination of how information and equipment the user groups will enter inside and outside, in which areas. Any change that occurs between these relationships affects the physical environment (Tetik 2013).

Since some university campuses tend to grow physically, they are educational institutions that combine various land uses. They include factors such as transportation, work, accommodation, rest and entertainment, which are the basic needs. They are places that differ from their surroundings in cities with their physical, demographic, social, economic and ecological structures. Considering this set of similar functions, the basic relationship between the city and the university campus emerges and the need to plan the relations between the city and the campus gains importance (Yıldızoğlu 2006).

For this reason, the concept of a campus that is suitable for social and cultural activities, where sustainable transportation is at the forefront, where topography is turned into an advantage, where faculty units can be connected with each other, and which interacts with the environment, expresses the basic principle in the planning approach. A university campus design should generally have a self-sufficient structure that includes all academic units and meets all the needs of users of all age groups. In this, it is necessary to consider and apply various design criteria.
4.1. Determination of University Capacity

One of the most necessary physical elements of universities, which is lacking in many universities today, is the fact that there are fewer indoor and outdoor spaces than needed, where all the staff and students in the university can come together and exchange ideas (Sıramkaya and Çınar 2012). Apart from this, in the criterion determined as the physical plan of the city, it should be possible to travel between reasonable distances in order to go to nature easily and go to work (Kuyrukçu 2012).

Pedestrian access in terms of the university city phenomenon is determined by the ability to walk from one end of the campus to one end of the campus in a reasonable time, comfortably, easily and without fatigue. The population of the campus should be determined according to the positive psychosociological factors that should exist among the individuals living in the campus (Karakaş, 1999).

4.2. Energy-saving

Each area has different climatic and natural characteristics. Energy consumption is a very important issue on environmental impact. The need for university campuses in energy efficiency is inevitable. It is necessary to implement and enforce energy conservation policies wherever possible. The selection of the university campus area and the equipment selected for the campus buildings are important issues in terms of energy saving and sustainability in the landscape. Energy savings can be achieved with landscape design applications. Landscape has an important place in the direct or indirect change of the microclimate of a place. By directing the natural elements in the campus areas, the harsh effects of the sun and wind can be minimized and thus energy savings are achieved (Tuna 2006).

With the right landscaping practices, it is possible to achieve thermal comfort with the help of plant elements in both summer and winter seasons. Changes were observed in the heating and cooling costs of the buildings in case of landscaping works with energy efficient applications. In addition to saving energy, air circulation can be increased by increasing green areas and plant material in urban areas. Therefore, with these studies, temperature control is provided around the building and the effects of the wind can be controlled. In addition, thanks to the oxygen released by plants into the air, the effects of greenhouse gases and air pollution can be reduced (Yüksek and İplikçi 2016).
4.3. Topography and land structure

During the landscape design phase, this issue should be considered first; appropriate areas should be created for the intended uses within the campus. If the land situation is not suitable for this, changes should be made on the land.

According to Alexander (1977), lands that allow agricultural practices are the most suitable lands for construction. However, as these areas are limited, once the properties of these lands are deteriorated, it may not be possible to correct them. Structural architectures should generally be built in the worst part of the land (Açıkay 2015).

The quality of the topography of the university campus area is the most important factor affecting the units that the campus will contain and the connection of these units with each other. For example, structures should be built based on the slope of the land. The rubble piles that come out of the excavation works should be transported to the areas to be filled. Apart from the building settlements, vehicle and pedestrian roads should also be passed through suitable sloping areas (Tolon 2006).

4.4. Functional Planting

University campuses significantly affect the urban ecology in terms of the area they cover. For this reason, in an ideal university campus, the priority should be the function in planting studies. Vegetation should be done where necessary to create a noise, wind and dust curtain. For this, the existing natural data on which the campus is located should be evaluated very well. It is of great importance in terms of creating a microclimate. For this reason, on-campus planting studies should be designed. From this point of view, an important responsibility has been imposed on the afforestation and forestry works carried out in the campus. In a study of such importance, plant species that survive in natural vegetation must be selected. This makes maintenance work easier and more economical (Tolon 2006).

The selection of plant species and the use of plants should be based on climate data during the landscape design phase of the campus. While designing the landscape, plant selection should be ensured by considering the visual and aesthetic qualities created by the form, color and texture characteristics of each plant. Since the climatic conditions directly affect the habitats and life cycle of plants, the plant species to be selected may be limited in number (Açıkay 2015).

The most striking green field work in a Campus landscape is road and alle afforestation. Effective and functional afforestation studies can be designed for many years with correctly selected plant species by experts in the field.
4.5. Green university buildings and green roofs

Green roofs play an important role in creating a common language in the environmental assessment of buildings and raising social awareness by pioneering sustainable design.

The design of the buildings in universities according to green building principles and their certification with the relevant certifications is an element of choice in sustainable campus applications in terms of showing that the buildings are energy efficient, indoor air quality and comfort properties are good. Studies have shown that there is a 20% increase in student performance in environments where sunlight is used more, and that a significant amount of energy consumption is saved at the same time. In our country, the demand for the green building concept is quite limited. Universities will be able to reduce the costs and effects that will occur during the life cycle of the building and minimize energy costs, if they make arrangements according to the green building concept in the improvements in their existing buildings or especially in the buildings, they will establish new.

4.6. Water use

Consideration should be given to the existing water situation while designing the campus. If there are water surfaces such as lakes, ponds, and rivers in the area, water basins should be determined for these areas, and structures should not be built within the basin boundary in order not to be damaged by events such as floods and tides. In addition to the presence of surface water, the presence of groundwater is also important. The depth of the building foundations should be determined by taking into account the groundwater level. Since groundwater is known to affect the geological structure, this issue should also be examined in terms of soil safety (Tolon 2006).

4.7. Sustainable landscape systems

The importance and place of university campuses in terms of a sustainable environment is quite large. Landscape materials used in a campus should be designed to be durable and not be destroyed over many years. A sustainable campus landscape aims to use materials with low impact (Tuna 2006). For example, on rainy days, the use of water-permeable materials to prevent rainwater flow and take it under the soil is among the material measures for sustainable landscaping. In lighting elements, luminaires should be chosen carefully so that they do not cause light pollution. Care should be taken to select luminaires with a luminous flux below 90°. Landscaping wastes should be prevented from going to waste with erosion and sedimentation control plan and low-environmental
methods such as mulching and composting during construction. In this way, sustainability is ensured by creating a cycle within itself. In sustainable landscape design, a wide variety of materials, from furniture to lighting, from decorative elements to covering materials, accompany the plants and ensure integrity. All these elements should be considered as a whole for sustainable design.

The main purpose in sustainable landscape design is; is the development of a self-sufficient, sustainable system that can be a part of the urban ecosystem. For this purpose, understandings that take nature as a model and bring systematic solutions to natural processes and the structural and ecological characteristics of the area should be adopted.

4.8. Transportation and parking

Basically, the transportation system of university campuses is evaluated in two categories as vehicle and pedestrian. In general, vehicle transportation is established for the connection of the academic region and the common use area and feeds the functions of these regions from outside. In general, pedestrian circulation within the campus should be kept as free as possible and teaching and research units should be kept away from vehicle noise. In cases where it is necessary for vehicle traffic to enter academic and communal areas, different ideas can be applied, such as lowering the vehicle roads below the ground level or constructing overpasses at certain points so that they do not intersect with pedestrian traffic (Kuyrukçu 2012).

Pedestrian transportation system in university campuses is divided into two categories as primary and secondary pedestrian connections. Primary pedestrian paths form a scheme that connects the campus areas and ensures pedestrian flow in the whole. The secondary ones are the secondary pedestrian paths that connect the units and open spaces to the primary roads. The important thing in both should be to reach the target without intersecting with the vehicle roads as much as possible (Kuyrukçu 2012).

Pedestrian priority transportation should be preferred, pedestrian and bicycle paths that will support this should be considered, and people with disabilities should also be considered in the design of these roads and in the selection of materials.

The reasons for parking problems in campus areas are various. Some of these are the result of general on-campus transportation problems, while others are due to the nature of parking (Yardım 2015).
Conclusion

Universities are not just educational and research institutions. In addition, they are also responsible for presenting examples and environments required by contemporary life to their students, employees, beneficiaries and people in their immediate surroundings. Universities should address their users by creating suitable environments and facilities for artistic, cultural, social and sports activities within the campus where they are established, and they also have to set an example for the society. For this reason, it is of great importance to plan university campus areas and adapt them to the environment. University campuses should be considered as other urban parks and should be handled within the professional discipline of landscape architecture. Because a well-planned university campus contributes to meeting the needs of the university staff, especially the students, and the people living in the city, such as resting, having fun, eating and drinking, engaging in social, cultural and sports activities, education and learning.
References


