A Reading Attempt of the Urban Memory of Eskisehir Osmangazi University Meselik Campus via Cognitive Mapping

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Abstract. University campuses have a small city view containing basic city functions such as work, accommodation, rest and transportation. They are spaces of social life that occupy large areas, have population density and different activities, change and grow with the cities they live in, and memorize the past accumulations. In this context, it is necessary for campuses to form and protect their own memories like cities. Campus memory is the ability of individuals to keep, maintain and - when necessary- reveal the experiences, sensations, comprehensions gathered from physical environment. "Cognitive mapping" is used to reveal the physical and emotional relationship that individuals make with the city and the individual-city interaction. Cognitive maps are created graphically using verbal and geometric items on paper by remembering these coded urban images. In this study, to determine the urban images belonging to Eskisehir Osmangazi University Meselik Campus, architecture students who have a short period experience of the campus were asked to note the areas they interact with the campus on the cognitive map. Campus memory items are identified by analysing the cognitive maps of the individuals who experienced the campus. In the direction of the obtained data, the campus area was re-read with five basic elements of Lynch: paths, districts, edges, nodes, and landmarks. As a result of these analyses, it is seen that religious structure, which is a large symbolic structure, located next to the main entrance in the settlement and health care facilities defined as landmarks are located in the memory of most of the individuals. Then, paths, nodes, districts, edges and educational buildings are listed respectively in cognitive maps.

1. Introduction

Universities are spaces of social life that memorize the past accumulations. University campuses include buildings, open spaces and green areas like a city. Naturally, besides facilities offered to resolve the physical requirements for users by buildings and their environments, it is aimed to resolve requirements as spiritual and conceptual based image, identity and meaning. Therefore, it is not only important creating the base of the image, identity and meaning in the design process of training, management and social tissue in university campuses [1], but it is also necessary to identify how individuals perceive the identity, image, and meaning. Because as Lynch [2] stated; environmental images are the result of a two-way process between the observer and his environment. Thus, the image of a given reality may vary significantly between different observers [2]. In this context, researchers have used cognitive mapping methods to detect the perceptions of the users of the physical environment [3].
A cognitive map that was firstly introduced by Edward Tolman in 1948, is a type of mental representation which serves an individual to acquire, code, store, recall, and decode information about the relative locations and attributes of phenomena in their everyday or metaphorical spatial environment [4]. In other words, cognitive mapping is formally defined by Downs and Stea [5] as “a process composed of a series of psychological transformations by which an individual acquires, codes, stores, recalls, and decodes information about the relative locations and attributes of phenomena in their everyday spatial environment”. In more general terms, a cognitive map may be defined as "an overall mental image or representation of the space and layout of a setting", which means that the act of cognitive mapping is "the mental structuring process leading to the creation of a cognitive map" [6].

An inhabitant’s spatial navigation is guided by an interaction between perceived environmental information and memories of where things are and how he got to them in the past [7]. Therefore, inhabitant’s cognitive map is generated from a number of sources, both from the visual system and elsewhere. Much of the cognitive map is created through self-generated movement cues. Inputs from senses like vision, proprioception, olfaction, and hearing are all used to deduce inhabitant's location within their environment as they move through it [8].

The physical environment in which inhabitants live is transformed into images that define the environment in the minds of inhabitants and include the characteristics of the environment. While the physical environment carries the same qualities for each inhabitant, images of the environment in the minds of inhabitants show differences in the direction of their experience. The method of cognitive mapping plays a major role in enabling inhabitants to perceive the physical environment. As a result of the evaluation of these maps, the legibility, perceived image and identity of the physical environment can be determined by the inhabitant.

Lynch [2] defines the legibility of the space as a visual cognitive act in which urban images are perceived by the inhabitant. He categorizes inhabitants’ image of the city into five physical elements. These elements play a key role in creating legible places and affects people’s perceptions of their environment.

These are paths, edges, districts, nodes and landmarks.

- Paths can be defined as a circulation network (such as streets, pavements, railways, etc.) connecting the urban elements and providing transportation.
- Edges are linear items that are not used by inhabitants as transportation axes. It acts as a boundary (such as coasts, rivers, forests and walls) between two regions, dividing the continuity linearly.
- Districts are large urban divisions and areas where inhabitants shape their physical boundaries in their minds and feel the area they are in.
- Nodes are the strategic point of the city where the roads intersect and the intersections occur.
- Landmarks are places or structures that have different texture than the current tissue and attracting attention of the inhabitant [2].

It is inevitable to determine the past and present memory items in city development plans and decisions to arrange them accordingly. Cognitive maps have been used in many researches in determining the perception and memory items belonging to the user of the city. This allows the researchers to get a sense of which parts of the city or place are more substantial or imaginable. This, in turn, lends itself to a decisive idea of how well urban planning has been conducted. In the literature, a number of studies have been carried out to investigate the visual quality of cities by using urban image elements and cognitive maps as expressed by Lynch [2].

Briggs [9] has identified three complementary ways in which cognitive maps are created in exploring how people formed mental images of a city. These are ‘through an individual's sensory modalities, from symbolic representations such as maps, from ideas about the environment which are inferred from experiences in other similar spatial locations’. Of these, an individual's sensory modalities provide direct sources of information and are more effective in cognitive map formation than indirect sources [5]. In another study, Kuipers [10] suggests that a cognitive map consists of five different types of information,
each with its own representation: Topological, Metric, Route Descriptions, Fixed Features and Sensory Images.

Appleyard [11] and Moore [12] gave route descriptions to adults and requested them to draw sketch maps of their cities. They found that the accuracy of these increased as a function of increased residence, but that even after several years of experience, the cognitive maps of adults were, overall, still distorted and fragmented. Unfortunately, these measures confound verbal and drawing ability with actual spatial knowledge. One purpose of the present study was to investigate changes in spatial knowledge of a large environment that occur with increased residential experience using a set of procedures that eliminate this confounding.

In 1976, Siegel and White [13] postulated that the essential types of spatial knowledge that comprise a cognitive map are landmarks, routes, and configurations. Landmarks are the salient locations, objects, and points of decision in an environment around which a person organizes his/her spatial activity. Routes are sensorimotor routines (lines of action) that guide an individual’s travel between landmarks. Configurations represent the integration of different routes into a coherent, well organized structure. They postulate that the three types of knowledge are hierarchical, with route knowledge dependent on landmark knowledge, and configurationally knowledge dependent on both landmark and route knowledge. A second purpose of the present study was to assess each of these types of spatial knowledge and their development as a function of increased residential experience.

In 1979, Herman et al. [14] tested the college freshmen for spatial knowledge of their campus after three weeks, three months and six months of experience. Surprisingly, knowledge of landmarks, routes, and configurations was very good after only three weeks, and increased significantly up to three months; further increases in spatial knowledge were not significant. Males had significantly more landmark knowledge than females; however, males and females did not differ significantly on route and configuration knowledge. The results are discussed in terms of the importance of distinguishing various types of spatial knowledge and developing assessment techniques for each that are not confounded by irrelevant performance factors.

Lynch [15] states in his work "The image of the periphery" that there is a two-way interaction between the observer and the environment. According to Lynch, the physical environment presents many images, but the observers make sense by choosing and editing these images according to their own experience. For this reason, he states that the urban images are shaped by the images they have created in the human mind. In his work, he has been chosen as a method of creating the mind maps of the people living in the city in order to determine the urban images that constitute the identity of the city in the past and present.

Ülkeryıldız et al. [16], requested a group of students to draw the urban pattern by using Lynch’s [2] principal city image patterns. They explore which city images are predominantly used in visual memory of the students and also which drawing styles are used by the students to construct the area in their mind. Research findings show that predominantly used map style is sequential, and most of the students primarily identify and emphasize landmarks and paths. Furthermore, research findings also suggest that environmental perception develops and changes with time and the experience gained from construction of relationship with the space.

Topçu & Topçu [17] used the analysis of the cognitive maps of the students of the city district planning department for the detection and improvement of the perceptual and spatial readability of the Selçuk University Campus in his study. The campus attempted to be read with five key elements of Lynch [2] (roads, zones, boundaries, focal points, and signposts) and the areas to be improved were identified by a 5-point scale developed by Nasar on spatial appreciation [17]. In another study, Öztürk [18], to determine the urban images belong to Eskisehir in the past and present, university students who have a short period experience of the city and inhabitants over sixty years old who have experienced the city from past till our day were asked to note the areas they interact with the city on the cognitive map. In these readings, it has been seen that there is no change in the symbolical structures belonging to the public while the areas of culture entertainment and commerce have been transformed as well as the loss
of actuality of green areas used in the past in relation with the occurrence of new thematic green areas. It was also seen that a new statue symbolism has been generated [18].

In this context, in this study, the roles of the physical environment and inhabitants are investigated in the formation of identity and image and how identity elements are meant by users on the sample of Eskisehir Osmangazi University Meselik Campus. The images that provide the formation of the campus memory will be analysed with the cognitive maps of architecture students. In conclusion; after obtaining and analysing the cognitive maps, it is determined which criterion has come forward when determining the image of the settlement for Eskisehir Osmangazi University Meselik Campus.

2. Material and Method

In the study, first-year students in architecture are requested to draw the campus plan by using Lynch’s [2] principal city image patterns to determine how the imaginary elements of the campus are located in their memories. Eskisehir Osmangazi University Meselik Campus Area which was chosen as a sample area is at the north-west side of the Eskisehir city. It has social facilities, dormitories and recreational areas that students can benefit from in addition to various educational buildings. Its general spatial order can be seen below at Figure 1.

![Figure 1. General spatial order of Eskisehir Osmangazi University Meselik Campus Area](image)

In this study, a group of first-class architecture students who experienced campus were asked to draw the 'cognitive map' of the campus, using the basic items (paths, boundaries, regions, node points, and reference points) that Lynch [2] has shown in his experimental work. The research was conducted with the participation of forty-seven architecture students (eighteen - twenty age group) who experienced the campus for a short time. The reason for the research being done with first class architectural students in the first week of their university studies is that these students must be completely foreign to the urban fabric, their professional identities have not yet formed, they have to be at the same age and education level and are foreign to the settlement as a visitor. For these reasons, it is predicted that they will form a good sampling profile in this study for comparison. Definition of the problem and the way of expression in Table 1 is presented to all observers to form the cognitive maps.

After presenting the problem in Table 1 to create a cognitive map for all students, they were asked to create a cognitive map by holding a paper A3 size horizontally. After they draw them, the cognitive maps of the students were evaluated and which elements of settlement are reflected in cognitive maps as paths, edges, nodes, districts and landmarks were determined. Then the number of these elements were calculated. In this respect, it has been tried to determine the level of perceivability, imageability and legibility of settlement by the students. Conceptual framework of this study can be seen below in Figure 2.
Table 1. Definition of the problem and the way of expression

| Definition of Problem | Describe the areas of settlement that you used in your everyday life in a unified manner. |
|-----------------------|------------------------------------------------------------------------------------------|
| Form of Expression    | Creation of map / sketch using geometric shape, silhouette, perspective, graphical expression, symbol and spelling language. |
| Description of Settlement | The use of structural and perceptual elements such as signs, images (sculpture, structure, road, etc.) that define the settlement. |

Figure 2. Conceptual framework of this study

3. Results and discussions
The aim of the study was to find out the architectural students’ perceptions and images related to the area in which they gain experience in the settlement. Thus, we got the students to draw the image of the area according to Lynch analysis [2]. In Table 2, different examples were given from the cognitive maps of the individuals who experienced the campus briefly.

When assessing the cognitive maps obtained from the study, classified according to the qualities of cognitive maps drawn and calculated the number of elements according to the imaginary elements such as paths, edges, nodes, districts and landmarks. As a result of evaluation, the paths ahead of the medical faculty, Rectorate and mosque are mentioned as paths; wall, city, river and forest that surround and limit the settlement area are mentioned as edges; four main intersections in the settlement are mentioned as nodes; squares in front of the Rectorate, arcade, social facility and ceremony area are mentioned as districts and faculty of medicine, mosque, sport fields and campus entrances as landmarks by students. The urban images of the settlement determined as a result of the evaluation of students' cognitive maps are shown in Table 3.

The image maps of the Meselik Settlement were formed by evaluating the cognitive maps drawn in the direction of the problem and method mentioned in Table 1. The images of the settlement in the maps are individually identified in Table 3 and then the number of times that these urban images are referenced is counted. Then it is expressed as a percentage by finding the share of each urban images in total that shown in Figure 3. The percentages of the total number of items found in the study are 27.36% with landmarks, 24.65% with paths, 22.73% with districts, followed by 19.72% and 5.47% with nodes and edges respectively. According to research findings, it is seen that students first perceived landmarks and paths and then respectively districts, nodes and edges. This situation doesn’t coincide with Lynch’s argument that was mentioned above in this study.
Table 2. Examples of Cognitive Mapping of Students Who Have Experienced Campus
Lynch expresses that districts and then paths will be emphasized first in urban perceptions that are expected to revive in the minds of inhabitants who have experienced the city for a short period of time. The reason for encountering a different outcome than Lynch described could be explained by the fact that students have faced more with the buildings and mosques of the medical faculty at the entrance of the settlement and found these structures more noticeable than other buildings in the settlement.

**Table 3.** The urban images of the settlement determined as a result of the evaluation of students’ cognitive maps

| Paths               | The paths ahead of the medical faculty, Rectorate and mosque. |
|---------------------|--------------------------------------------------------------|
| Edges               | Wall, city, river and forest that surround and limit the settlement area. |
| Nodes               | Nodes are four main intersections in the settlement.         |
| Districts           | Squares in front of the Rectorate, arcade, social facility and ceremony area. |
| Landmarks           | The landmarks are faculty of medicine, mosque, sport fields and campus entrances. |

When we evaluate landmarks, sports fields and gates at the campus entrance are located in cognitive maps after the medical faculty and the mosque which are located at the entrance of the settlement (Figure 4). When the results are examined, it is seen that the landmarks located at the entrance of the settlement are largely placed in the minds of the students. In addition, it is also thought that sports fields are included in cognitive maps due to the interest of students.
Landmarks are followed by paths and nodes. Paths that form the main vehicle and pedestrian transportation of the settlement that pass in front of the Faculty of Medicine, Rectorate and mosque and nodes where the settlement's main entrance paths are intersected are located in the cognitive maps of the students respectively.

Students perceive squares in front of the Rectorate, arcade, social facility and ceremony area (Figure 5). The green area and the ceremony area at the entrance of the settlement, which were spread over a wide area, were expected to be emphasized more in students' cognitive maps. It was thought that ceremony area which places entrance of the campus to be more emphasized due to the location and the large green area and cafeteria it contained. However, when the results are evaluated, it is seen that the students draw the areas in front of the buildings that they use more frequently on their cognitive maps.
Edges act as a boundary (such as coasts, rivers, forests and walls) between two regions, dividing the continuity linearly. In this study, wall, city, river and forest that surround and limit the settlement area are mentioned as edges. The percentages of the total number of items found in the study are 45.00 % with city, 30 % with wall, 15.00 % with forest and 10 % with river (Figure 6).

4. Conclusions
Urban identity formation is a process that extends from the past to the future, including past items, reinterpretation of past items, and a new chain of items. In this context, the identity of the city needs to be considered as an important planning parameter. Urban inhabitants and the natural values of the city, which are active in the formation of the city's identity, should also be able to guide the city's planning strategies. In order to provide this, it is necessary to determine what urban images constitute the identity of the city. Urban imagery is shaped by the images that are formed in the minds of the inhabitants who are the users of the city. Cognitive maps are used to detect individual perceptions of the physical environment. Cognitive map is a way of transferring the images belonging to the physical environment formed in inhabitants' minds onto paper. In addition, cognitive maps are graphical expressions which are also supported by words, colours, pictures and symbols, coded by visualizing the connection with concepts and memories.

In this study, studies on cognitive mapping methods in urban and small university campuses which look like small cities were investigated. Then, first-class architectural students who have experienced the campus briefly is requested to draw cognitive maps of Eskisehir Osmangazi University Meselik Campus. In this respect, it has been tried to determine the level of perceivability, imageability and legibility of settlement by the students. Then, by the evaluation of cognitive maps of the students, it has been determined which elements of the settlement are reflected in the cognitive maps as paths, edges, nodes, districts and landmarks. In the direction of the obtained data, it is seen that landmarks are located in the memory of most of the individuals. Then, paths, districts, nodes, edges and educational buildings are listed respectively in cognitive maps.

This study was made by architecture students who experienced the settlement for a short time. The study can be repeated annually with the same students to investigate the effects of short and long-term experience on the image of the city in their minds. In addition, by the comparison of the cognitive maps, it can also be determined whether architectural education has an effect on the development of presentation techniques and on the perception of urban images.
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