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İSTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY

**A MULTI-FACTOR ANALYSIS MODEL TO DETERMINE  
THE USE VALUE OF ENCLOSED OUTDOOR SPACES**

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**Date of submission : 12 July 2004**

**Date of defence examination: 30 November 2004**

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**NOVEMBER 2004**

**İSTANBUL TEKNİK ÜNİVERSİTESİ ★ FEN BİLİMLERİ ENSTİTÜSÜ**

**BİNALARLA TANIMLANMIŞ DIŞ MEKANLARIN KULLANIM DEĞERİNİ  
SAPTAMAYA YÖNELİK ÇOK FAKTÖRLÜ BİR ANALİZ MODELİ**

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**Tezin Enstitüye Verildiği Tarih : 12 Temmuz 2004  
Tezin Savunulduğu Tarih : 30 Kasım 2004**

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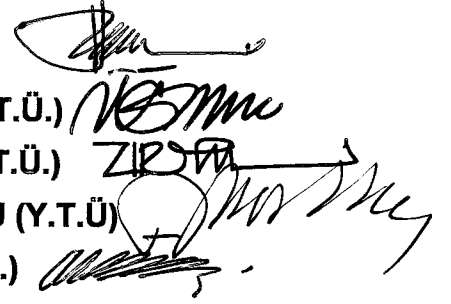
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**KASIM 2004**



## ACKNOWLEDGEMENTS

I started to form the ideas and problems of this thesis during the research that I carried out at North Carolina State University, College of Design in 2001. Up to now, many people have helped me throughout the entire process. This dissertation, indeed, would not have been completed without their valuable help.

I would like to thank my advisor, Prof. Dr. Hasan Şener, for his guidance, support and supervision throughout this study. He always motivated me not only during this thesis, but also from the beginning stages of my architectural studentship, and especially encouraged my decision to go on doing research for a while abroad. I am grateful to my thesis' supervisory committee members, Prof. Dr. Uğur Erkman and Prof. Dr. Necati Inceoğlu, for their valuable criticisms, suggestions and the encouragement they showed during the entire process.

I owe one of my greatest debts to Prof. Henry Sanoff, who more than any other person taught me the meaning of “research”. As my supervisor during my stay at NCSU, he helped me to develop my ideas and provided significant help in regard to the methodology of the dissertation. After I returned to my home country, I continued to get his support; he replied patiently to my many questions by e-mail. My sincere thanks go to him for his valuable criticisms, ideas and suggestions.

I would like to express my gratitude to Prof. Dr. Burç Ülengin from ITU, Department of Management Engineering, who helped me in advanced statistical analyses, without his help I could not have completed the statistical analyses processes and interpreted the results. I also wish to thank Management Engineer Selçuk Kılıç (ITU), who showed me how to use SPSS and helped me in the initial statistical analyses at the beginning stages.

I owe thanks to Özge Güngördü, a graduate candidate of the Institute of Informatics at ITU, who did drawings and 3-D models of settings. I also would like to thank Lecturer Lisa Scholter from ITU College of Foreign Languages, who did the proofreading.

I wish to thank my family members, my father, my elder sisters Assist. Prof. Dr. Sabiha Yıldız, Dr. Beyhan Yıldız Kılıç and my brother-in-law Assoc. Prof. Dr. Osman Kılıç for their moral support and patient understanding.

My sincere thanks also go to my closest friends, Architect Sevgi Paçcı, Architect M.Sc. Meral Ekincioğlu, Architect Dr. Çelen Paşalar, who always supported me emotionally in the completion of my work.

Last but not least, this dissertation is dedicated to the memory of my beloved mother.

June, 2004

Dilek YILDIZ

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## **A MULTI-FACTOR ANALYSIS MODEL TO DETERMINE THE USE VALUE OF ENCLOSED OUTDOOR SPACES**

### **SUMMARY**

This thesis analyzes the concept of “*use value*” of enclosed outdoor spaces, and examines its relationship with the presumed factors, which are derived from an existing body of literature and earlier research results. Accordingly, the objectives of this research can be stated as the following:

- To understand, analyze and evaluate the concept of use value,
- To look into the relationship between the concept of use value and some certain factors, to search for how and to what extent use value is dependent on these factors,
- To test the validity of the proposed model by searching for the effects of these presupposed factors and finally,
- To obtain some implications which make these spaces inviting, attractive and nice for the design of enclosed outdoor spaces in future, and thus raise the quality of life between buildings.

The problems of this research have been approached from the perspective of environment-behavior studies, which is a discipline concerned with developing the theory of environmental design. Among the models of environment-behavior interaction, the eco-behavioral approach comprises a suitable base for this study. The ecological analysis of a designed environment emphasizes the nature of mechanisms that link people and environments and proposes the means for studying the spatial properties of human behavior.

The strength of ecological psychology is that, indeed, it focuses attention on the environment. In this regard, it provides the concept of “*behavior setting*” (BS), which is essentially the same as “*activity-space*”. According to the behavior setting theory, the environment consists of a set of behavior settings that afford certain behaviors and activities. Thus, behavioral settings as “*natural life units*” are stable combinations of activity and place in a specific period of time.

According to this point of view, a better understanding of the use value of enclosed outdoor spaces requires attention on these two main theoretical issues below:

- Relations between people (individuals or groups) and place, including behavior settings and their social and cultural contexts,
- Users’ information processing of the physical environment and their affordances by means of mutual interaction among environmental cues, affordances, perception, and meaning.

The use value of enclosed outdoor spaces in this study is described as a combination of,

- Activity diversity (number of different types of activities),
- Frequency of activities (how many times per week users engage in each activity)
- Use density (number of people engaged in activities at a specific period of time) and,

- Occupancy time (the total period of time per week that users spend in each setting).

The major hypothesis of this study is based on the assumption that there are many factors, which are physical, social-cultural, climatic and so forth on the use value of enclosed outdoor spaces. Thus, the overall use of an enclosed outdoor space will be the result of both interactions and comprehensive integration of all these related factors-elements. Each of these factors has an effect on the use value to varying degrees, and altogether they may establish an analysis model to determine and evaluate the use value in enclosed outdoor spaces. Physical features, enclosure, spatial layout, aesthetic-visual quality, pedestrian movement, context, planned activities, period of time and user profile are considered as factors that can be influential on the use value.

The second major hypothesis is that the diversity, frequency and duration of activities, which are the components of use value, would be a function of physical and architectural features, since they provide cues for actions. In this regard, the minor hypothesis of this study is that the degree of enclosure of outdoor spaces may affect the way people use them. Being enclosed by buildings offers a potential user group, which are users of those buildings, to adjacent outdoor spaces. Depending upon the edge effect, buildings create an influence area around themselves, in which both use density and patterns tend to differentiate in comparison with the areas which are away from them.

In order to test these hypotheses, this study has employed a multi-technical method including:

- **Descriptive analysis:** Recording the physical features of the setting that can be related to use variables, by taking photographs and field notes;
- **Field observations:** Systematic observations of users for behavioral mapping, which provides place specific information: namely 'who' is doing 'what' and 'where',
- **Questionnaires:** Face to face questionnaires with 209 respondents to search for the relations between presumed factors and the components of use value.

Offering places for a wide range of student activities in outdoor spaces, campus environments seemed appropriate places as case study settings. The case study was conducted at the Middle East Technical University Campus located in Ankara. Before the selection of this campus environment, seven different campuses in Istanbul and Ankara were visited. Among all these visited campus environments, being one of the oldest and biggest university campuses in Turkey, it was observed that the outdoor space use of METU Campus has a settled and steady character. According to the information obtained after the initial observations, the first three heaviest used settings on the main pedestrian alley of the campus were selected for examination.

Firstly, by using descriptive analyses, the successful and unsuccessful features of these settings were determined and then they were analyzed based on some specific elements such as surrounding façades, entrances, focal points and transition spaces.

The three selected spaces were observed throughout five weekdays during the time intervals, which was from 12.10 a.m. to 1.10 p.m. After the observations, it was found that different locations in selected settings depending upon their physical features support different use patterns. For example, it has been noticed that while the seating wall or the ledge affords only watching, smoking or sitting-resting for a short duration, the grassy open area with shaded trees affords many activities like eating, chatting, reading, listening to music and lying down-sleeping. In this regard,

green areas with many shaded trees were determined as the most “*behavior-generating*” features for these cases. Many students preferred seating walls and benches facing the settings where they can see people passing by. In this regard, open grassy areas, benches and sitting walls are the most influential physical features on the behavior patterns of enclosed outdoor settings.

In all settings, the main entries to the surrounding buildings or front yards were highly used. Many users defined them convenient and the closest place to their departments as home-base. Conversely, along the straight edges of the façades, that is, where there was not a relationship between an indoor and outdoor space, there was also a clear decrease in use density, suggesting that the boundary treatment between indoor and outdoor affords use density. Likewise, use shows a much more dense character in the areas adjacent to the surrounding buildings compared to open-grassy areas, which generally had a widespread pattern. It was observed that both the activity types and the duration of activities showed changes in the front yards in comparison with the areas which are away from them. For example, users usually spent approximately from twenty minutes to three hours at grassy-open areas while engaging in chatting, games in groups, reading or listening to music by themselves, whereas they only spent a maximum of ten or fifteen minutes in the front yards of the surrounding buildings while engaging in waiting for friends, chance meetings or chatting for a short period.

Statistical analyses have been employed in three steps:

1. **Factor analysis:** Applying factor analysis each independent variable showed how users perceived this variable by which sub-variables,
2. **Correlation analysis:** Each sub-variable has been correlated with the dependent variables,
3. **Multiple regression analysis:** In order to explain each dependent variable, multiple regression analyses have been applied to the whole independent variables altogether.

Low R values obtained as a result of correlation analyses show that there are not strong relationships between the dependent and the independent variables. These values showed that it is not possible to explain the dependent variables only with one independent variable and there may be many influential ones in this problem area. This actually supports the hypotheses of the research and it reveals the requirement of doing multiple-regression analyses.

When both observations, correlation and regression analyses were taken into account, it was reached the following results about each independent variable’s relationship to the dependent ones.

**Physical features:** Physical features showed relations with occupancy time and activity diversity. Even though this variable is the sixth in the order of importance according to the quantitative analyses, based on both observations and analysis of the responses to the open-ended questions, it is possible to state clearly that behavior patterns changed according to the different attributes of the environment and this is an indicator of the effect of physical features on the use value.

**Enclosure:** Use frequency of surrounding buildings showed the most significant relations with almost all of the components of use value. Accordingly, the more frequently people use indoor functions, the more frequently they use the outdoor spaces; the more they spend time outdoors, the more they engage in diverse activities. On the other hand, according to the quantitative analyses, other components of enclosure such as transition spaces, perceived degree of enclosure and boundary conditions did not indicate to have significant relations with use value components.

**Aesthetic-visual qualities:** When users think that an outdoor space is visually beautiful, attractive, inviting, comfortable and unique, briefly if it causes users to have some positive associations in their minds, they spend much more time in that outdoor space.

**Context:** Context was found to have relations with all of the components of use value. Accordingly, if an outdoor space has a central location on the whole campus, it is easily accessible and it is on the path of everyday circulation of users, especially the activity diversity of that outdoor space is likely to be at a high level.

**Spatial layout:** It was found that spatial layout has relations with all of the components of the use value, but it especially influences occupancy time.

**Planned activities:** Being one of the most important factors of the proposed model, it has strong effects on both activity diversity and occupancy time.

**Pedestrian movement:** Pedestrian movement has relations with activity diversity and occupancy time. The higher the rate of people passing through the space, the more users spend time outdoors.

**Period of time:** 62.5% of users stated that they use outdoors much more frequently in spring. F test analysis ( $f: 4.25, p: 0.01$ ) showed that seasonal differentiations is just influential on occupancy time by individuals. According to the T test analysis, specific period of time over a weekday does not have any effect on dependent variables. However, 41.5% of users stated that they use outdoors at noon between 12 a.m.-2 p.m., 36.1% of users stated that they use outdoors in the afternoon between 2 p.m.-5 p.m.

**User profile:** Users' habits and attitudes about outdoors have strong relations with occupancy time and activity diversity. As the total residency time on campus increased (those users are post graduate students), users engage in less diverse activities and spend less time outdoors. According to the T test results, which was done to see the effects of gender, it was found that female users spend much more time ( $t: 3.19, p:0.00$ ) and engage in more diverse activities ( $t:2.35, p:0.02$ ) in the settings.

This research showed that there are, in fact, many factors which are influential on the use value of enclosed outdoor spaces. However, it was found that some of them are very influential, while others are less influential. Briefly, quantitative findings revealed the order of importance of independent variables as the following:

1. Enclosure
2. Planned activities
3. Spatial layout
4. User profile
5. Context
6. Physical features
7. Pedestrian movement
8. Aesthetic-visual qualities
9. Period of time.

While proving the significance of some factors mentioned above, this study also revealed new effects that have not been taken into account at the beginning of the study and each of them is a nominee for being considered as factors for future researches. Thus, further research is needed to examine in detail;

- Proximity to the high activity buildings,
- Visibility-the presence of good viewing areas,
- Presence of other people-friends,
- Attachment to the space, and
- Sittable space and shaded space.



In brief, it is important to keep in mind that the use value of enclosed outdoor spaces depends on many factors working together, yet in different cases some might be more important than others. More importantly, the findings of current study can only help to draw some implications for the design of enclosed outdoor spaces in future and the enhancement of use patterns, but it cannot offer guidelines for making generalizations.

Consequently, the proposed model in this study can be used to determine and evaluate the use value of enclosed outdoor spaces and therefore it can also give guidance to the designers at the design stage and can orient future research as well. This model may have been instrumental not only in the scope of design practice for architects, landscape architects and urban designers, but also in the area of planners, psychologists and other social researches. They can all benefit from the results of this research.

**Keywords:** Enclosed outdoor spaces, campus environments, use value, eco-behavioral approach, factors and physical features.



## BİNALARLA TANIMLANMIŞ DIŞ MEKANLARIN KULLANIM DEĞERİNİ SAPTAMAYA YÖNELİK ÇOK FAKTÖRLÜ BİR ANALİZ MODELİ

### ÖZET

Bu tez çalışması binalarla tanımlanmış dış mekanların kullanım değerini analiz etmekte; bu kavramın önceki araştırma sonuçları ve mevcut literatürün incelenmesi sonucunda elde edilen faktörlerle ilişkisini incelemektedir. Buna göre, araştırmanın amaçları şöyle ifade edilebilir:

- “Kullanım değeri” kavramını anlamak, analiz etmek ve değerlendirmek,
- “Kullanım değeri” kavramı ile önceden tahmin edilen faktörler arasındaki ilişkileri; kullanım değerinin bu faktörlere nasıl ve ne derece bağımlı olduğunu araştırmak,
- Önceden tahmin edilen faktörlerin etkilerini araştırmak suretiyle önerilen modelin geçerliliğini test etmek ve son olarak,
- Gelecekte binalarla tanımlanmış dış mekanların tasarımında gözönünde bulundurulabileceği düşünülen, bu mekanları çekici, hoş, davet edici kılan bazı önermelerde bulunmak ve böylece binalar arasındaki yaşamın kalitesini yükseltmek.

Araştırmanın problem alanına, çevresel tasarım kuramını geliştirmekle ilgili bir disiplin olan çevre-davranış çalışmalarının perspektifinden yaklaşılmıştır. Çevre-davranış etkileşimini açıklayan modeller arasında, eko-davranışsal yaklaşım bu çalışma için uygun bir zemin hazırlamaktadır. Tasarlanmış bir çevrenin ekolojik analizi insanları ve çevreyi birbirine bağlayan mekanizmanın doğası üzerinde durmakta ve insan davranışının mekansal özelliklerini incelemek için yöntemler önermektedir.

Ekolojik psikolojinin gücü çevre üzerinde odaklanmasından kaynaklanmaktadır. Bu bağlamda, ekolojik psikoloji “*aktivite-mekan*” ile temel olarak aynı olan “*davranış üniteleri*” kavramını ortaya koymaktadır. Davranış ünitesi kuramına göre çevre belirli aktivite ve davranışları destekleyen bir davranış üniteleri kümesidir. Böylece, davranış üniteleri “*doğal yaşam birimleri*” olarak belirli bir zaman diliminde, aktivite ve yerin sürekli bir birleşimi olarak tanımlanabilir.

Bu bakış açısına göre binalarla tanımlanmış dış mekanların kullanım değerini daha iyi kavramak, öncelikle aşağıdaki iki temel kuramsal konu üzerinde odaklanmayı gerekli kılar:

- Davranış üniteleri ve bu ünitelerin sosyal ve kültürel bağlamlarını kapsayan insanlar (bireyler ya da gruplar) ve yer arasındaki ilişkiler,
- Çevresel ipuçları, algılama, anlam ve çevresel destekleyiciler yoluyla kullanıcıların fiziksel çevre hakkındaki bilgi işleme süreci.

Binalarla tanımlanmış dış mekanların kullanım değeri bu çalışmada;

- Aktivite çeşitliliği (farklı aktivite türlerinin sayısı)
- Aktivitelerin sıklığı (kullanıcıların her bir aktiviteyi haftada kaç kez yaptıkları)
- Kullanım yoğunluğu (belirli bir zaman dilimdeki toplam kullanıcı sayısı)
- Mekanda kalış süresi (kullanıcıların söz konusu mekanda bir haftada toplam geçirdikleri süre)’nin bir birleşimi olarak tanımlanmıştır.



Bu çalışmanın temel hipotezi, kuşatılmış dış mekanların kullanım değerini etkileyen fiziksel, sosyo-kültürel, iklimsel vb. pek çok faktörün olduğu görüşüne dayanır. Bu bağlamda, binalarla tanımlanmış bir dış mekanın toplam kullanım değeri tüm bu ilişkili faktörlerin hem karşılıklı etkileşimi, hem de kapsamlı bir birleşimi sonucunda oluşur. Her biri çeşitli derecelerde kullanım değeri üzerinde etkili olan bu faktörler bir arada, binalarla tanımlanmış dış mekanların kullanım değerini saptamaya ve değerlendirmeye yönelik bir analiz modeli oluşturabilirler. Kullanım değeri üzerinde etkili olabilecek faktörler burada fiziksel nitelikler, tanımlanmışlık, estetik-görsel nitelikler, yaya hareketi, bağlam, planlanmış aktiviteler, zaman aralığı ve kullanıcı profili olarak saptanmıştır.

İkinci temel hipotez, kullanım değerinin bileşenleri olan aktivitelerin çeşitliliği, sıklığı ve süresinin, eylemler için ipucu sağlamaları nedeniyle mimari ve fiziksel niteliklerin etkileri sonucunda oluştuğu konusundadır. Bu bağlamda çalışmanın ikincil derecedeki hipotezi, dış mekanların tanımlanmışlık derecesinin kullanıcıların o mekanı kullanma şeklini etkileyebileceğidir. Binalar tarafından çevrelenmiş olmak, çevreleyen binaların kullanıcısı olan olası bir kullanıcı grubunun bina yakınındaki dış mekanları kullanmasını sağlar. Aynı zamanda “sınır etkisi” ne bağlı olarak binalar etrafında, kullanım yoğunluğu ve örüntülerinin binalardan uzaktaki alanlara göre farklılaşma eğiliminde olduğu bir etki alanı yaratır.

Tüm bu hipotezleri test etmek için bu çalışmada çok teknikli bir yöntem kullanılmıştır:

- **Tanımlayıcı analiz:** Fotoğraflar ve alanda alınan notlarla kullanım değeri ile ilişkili olabilecek mekanın fiziksel niteliklerini kaydetmek.
- **Alan gözlemleri:** Yere özel bilgi sağlayan yani “kim”, “nerede”, “ne yapıyor” u anlatan davranışsal haritalama için kullanıcıların sistematik olarak gözlemlenmesi,
- **Anketler:** Kullanım değeri bileşenleri ve tahmin edilen faktörler arasındaki ilişkileri bulmak amacıyla 209 kullanıcıyla yüz yüze yapılan anketler.

Dış mekanlarında çok çeşitli öğrenci aktiviteleri için yerler sunan kampus çevreleri alan çalışması için uygun görülmüştür. Alan çalışması Ankara’da Orta Doğu Teknik Üniversitesi Kampusu’nda yapılmıştır. Bu kampus çevresinin seçiminden önce, Ankara ve İstanbul’da yedi farklı kampus ziyaret edilmiştir. Tüm bu kampüsler arasında, Türkiye’nin en eski ve en büyük kampüslerinden biri olarak, ODTU Kampusu’nun dış mekan kullanımının değişmeyen ve tutarlı bir karakterde olduğu görülmüştür. Ön gözlemler sonucunda elde edilen bilgiler doğrultusunda kampus içindeki ana yaya aksı üzerinde en yoğun kullanılan üç mekan seçilmiştir.

İlk olarak tanımlayıcı analizlerle seçilen bu mekanların başarılı ve başarısız nitelikleri tespit edilmiş, daha sonra mekanı çevreleyen cepheler, girişler, mekandaki odak noktaları, geçiş mekanları gibi belirli elemanlar analiz edilmiştir.

Gözlemler haftanın beş günü saat 12.10-13.10 arasında seçilen bu üç mekan için ayrı ayrı yapılmıştır. Gözlemlere göre seçilen mekanların içindeki farklı konumların fiziksel nitelikleri doğrultusunda farklı kullanım örüntülerini desteklediği bulunmuştur. Örneğin, mekanın sınırlarında yer alan alçak duvarların, kısa süreli oturma-dinlenme, sigara içme, etrafı seyretme gibi aktiviteleri desteklediği, diğer taraftan ağaçlı, gölgelik açık-çimen alanların yeme-içme, okuma, sohbet etme, çimende uzanma-uyuma, müzik dinleme gibi pek çok farklı aktiviteyi desteklediği fark edilmiştir. Bu bağlamda, ağaçlı çimen alanların bu alan çalışması için en çok “davranış üreten” fiziksel eleman olduğu saptanmıştır. Öğrencilerin büyük bir çoğunluğu bulundukları yerden gelen-geçen insanları görebilecekleri alçak duvarları ve bankları tercih etmişlerdir. Bu bağlamda, banklar, oturulan alçak duvarlar, gölgeli çimen alanlar kuşatılmış dış mekanların kullanım değeri üzerinde en etkili olan fiziksel elemanlardır.

Bütün mekanlarda çevreleyen binaların ana girişleri ya da ön bahçeleri (karşılama mekanları) çok yoğun kullanılmıştır. Kullanıcıların çoğunluğu bu bölgeleri elverişli-uygun ve evleri kabul ettikleri kampusteki kendi bölümlerine en yakın yerler olarak tanımlamışlardır. Aksine, iç mekan ile dış mekan arasında ilişkinin olmadığı cephelerin düz sınırları boyunca kullanım yoğunluğunda belirgin bir azalma vardır ki, bu da iç ile dış arasındaki sınır koşullarının kullanım yoğunluğunu desteklediğini göstermektedir. Benzer şekilde, kullanım çevreleyen binalara yakın alanlarda, yaygın bir kullanım örüntüsü olan açık-çimenlik alanlara kıyasla çok daha yoğun bir karakter gösterir. Hem aktivite türlerinin hem de aktivitelerin süresinin ön bahçelerde uzaktaki alanlara kıyasla farklılık gösterdiği gözlemlenmiştir. Örneğin, kullanıcılar çimenlik açık alanlarda gruplar halinde sohbet etme, oyun oynama, okuma, müzik dinleme gibi aktivitelerle ortalama yirmi dakikadan üç saate kadar vakit geçirirken; çevreleyen binaların ön bahçelerinde buluşmak üzere arkadaşlarını beklerken, tesadüfen arkadaşlarıyla karşılaşp ayaküstü sohbet ederken maksimum on yada onbeş dakika vakit geçirmektedirler.

Anketlerin değerlendirilmesi için kullanılan istatistiksel analizler üç aşamada gerçekleştirilmiştir:

1. **Faktör analizi:** Her bir bağımsız değişkene faktör analizi uygulanarak kullanıcıların bu değişkeni kaç alt değişkenle algıladığı saptanmış,
2. **Korelasyon analizi:** Bulunan her bir alt değişken bağımlı değişkenlerle ikili setler halinde korelasyon analizine tabi tutulmuş,
3. **Çoklu-regresyon analizi:** Son olarak her bir bağımlı değişkeni açıklamak için, tüm bağımsız değişkenlere bir arada regresyon analizi yapılmıştır.

Korelasyon analizleri sonucunda bulunan R değerlerinin yüksek olmayışı bağımlı ve bağımsız değişkenler arasında çok kuvvetli ilişkilerin olmadığını göstermektedir. Bulunan bu değerler bağımlı değişkenleri tek bir tek bir değişkenle açıklamanın mümkün olmadığı ve bu alanda pek çok değişkenin etkili olabileceği düşüncesine yol açmaktadır. Bu da aslında araştırmanın varsayımını desteklemekte ve bu alanda çoklu regresyon analizleri yapmanın gerekliliğini ortaya koymaktadır. Bu analizler ile her bir bağımlı değişkeni açıklayan bağımsız değişkenler seti bulunmuştur.

Hem gözlemler, hem de korelasyon ve regresyon analizleri gözönünde bulundurulduğunda her bir bağımsız değişkenin bağımlı değişkenlerle ilişkileri hakkında şu sonuçlara ulaşılmıştır:

**Fiziksel nitelikler:** Fiziksel nitelikler mekanda kalma süresi ve aktivite çeşitliliği ile ilişkiler göstermiştir. Bu değişken niceliksel analizlerde önem derecesi olarak altıncı sırada yer almasına rağmen, hem gözlemler, hem de açık-uçlu sorulara verilen yanıtların analizine dayanarak, davranış örüntülerinin çevrenin fiziksel niteliklerine göre değiştiği, bunun da fiziksel niteliklerin kullanım değeri üzerindeki etkisinin bir göstergesi olduğu söylenebilir.

**Tanımlanmışlık:** Çevreleyen binaların kullanım sıklığı tüm bağımlı değişken bileşenleriyle önemli ilişkiler göstermiştir. Buna göre, kullanıcılar dış mekanı çevreleyen binaları ne kadar sık kullanırlarsa, dış mekanda da o kadar çok vakit geçirmekte, daha farklı aktivitelerle uğraşmakta ve bu aktiviteleri daha sık yapmaktadırlar. Diğer taraftan niceliksel analizlere göre tanımlanmışlık altında ele alınan diğer bileşenler örneğin geçiş mekanları, algılanan tanımlanmışlık derecesi, sınır koşulları kullanım değeri üzerinde çok önemli bir etki göstermemiştir.

**Estetik-görsel nitelikler:** Kullanıcılar mekanı güzel, çekici, davet edici, rahat, özgün buldukları zaman, kısaca zihinlerinde mekanla ilgili pozitif bir imge oluşturdıklarında mekanda daha uzun zaman geçirmektedirler.

**Bağlam:** Bağlam kullanım değerinin tüm bileşenleri ile ilişkili bulunmuştur. Buna göre, eğer dış mekan tüm kampus içinde merkezi bir konumdaysa, kolaylıkla

ulařılabiliriyorsa ve kullanıcıların kampus içindeki günlük dolařımları üzerindeyse o mekandaki özellikle aktivite çeřitiliđinin yüksek olması beklenmektedir.

**Mekansal düzen:** Mekansal düzenin kullanım deđerinin tüm bileřenleriyle iliřkili olduđu ancak özellikle mekanda kalıř süresini etkilediđi bulunmuřtur.

**Önceden planlanmıř aktiviteler:** Modelin en önemli faktörlerinden biri olarak hem aktivitelerin çeřitiliđi hem de mekanda kalıř süresi üzerinde önemli etkileri olduđu saptanmıřtır.

**Yaya hareketi:** Yaya hareketi aktivite çeřitiliđi ve mekanda kalma süresi ile iliřki göstermiřtir. Mekanın içinden geřen insan sayısı arttıkça kullanıcıların mekanda geçirdikleri süre de artmaktadır.

**Zaman aralıđı:** Kullanıcıların %62.5'i dıř mekanları baharda daha sık kullandıklarını belirtmiřlerdir. F test analizi mevsime göre farklılařmanın sadece bireylerin mekanda kalıř süresi üzerinde etkili olduđu göstermiřtir (f:4.25, p:0.01). T test analizine göre, gün içindeki zaman diliminin bađımlı deđiřkenler üzerinde herhangi bir etkisine rastlanmamıřtır. Bununla birlikte, kullanıcıların %41.5'i dıř mekanları öğlen saat 12.00-14.00 arasında, %36.1'i ise öğleden sonra 14.00-17.00 arasında daha sık kullandıklarını belirtmiřlerdir.

**Kullanıcı profili:** Kullanıcıların dıř mekan kullanımına yönelik alışkanlık ve eđilimleri aktivitelerin çeřitiliđi ve mekanda kalma süresi üzerinde önemli etkiler göstermiřtir. Öğrenciler kampusta bulundukları toplam süre arttıkça (ki bu öğrenciler master ve doktora öğrencileridir) dıř mekanları daha az kullanmakta ve dıř mekanlarda daha vakit geçirmektedirler. Cinsiyetin etkilerini görmek için yapılan T test sonuçlarına göre, kadınların erkeklere göre mekanda kalıř sürelerinin daha fazla olduđu (t: 3.19, p:0.00) ve mekanda erkeklere oranla daha farklı aktivite çeřitleriyle (t:2.35, p:0.02) meřgul oldukları görölmüřtür.

Bu arařtırma kuřatılmıř dıř mekanların kullanım deđerini etkileyen pek çok faktör olduđunu göstermiřtir. Bununla birlikte, bu faktörlerden bazılarının kullanım deđeri üzerinde çok etkiliyken, diđerlerinin daha az etkili olduđu bulunmuřtur. Özetle niceliksel bulgular bađımsız deđiřkenlerin önem sırasını řöyle ortaya koymuřtur:

1. Tanımlanmıřlık
2. Planlanmıř aktiviteler
3. Mekansal düzen
4. Kullanıcı profili
5. Bađlam
6. Fiziksel nitelikler
7. Yaya hareketi
8. Estetik-görsel nitelikler ve
9. Zaman aralıđı.

Bu çalıřma yukarıda bahsedilen faktörlerin önemlerini gösterirken, aynı zamanda çalıřmanın bařında göz önüne alınmamıř, gelecekteki arařtırmalarda birer faktör olarak düřünülmeye aday olan yeni etkileri ortaya çıkarmıřtır:

- Kullanım yoğunluđu yüksek olan binalara yakınlık,
- Görünebilirlik-iyi görüř alanlarının varlıđı,
- Diđer insanların varlıđı,
- Mekanla duygusal bir bađın oluřmuř olması,
- Oturma mekanı ve gölge mekanlar.

Özetle, binalarla tanımlı dıř mekanların kullanım deđerinin bir arada çalıřan pek çok faktöre bađlı olduđu unutulmamalıdır. Ancak farklı durumlarda faktörlerin bazıları diđerlerinden daha önemli olabilir. Daha da önemlisi, çalıřmanın bulguları gelecekte binalarla tanımlanmıř dıř mekanların tasarımı ve bu mekanlardaki kullanım

örüntülerinin zenginleştirilmesi için bazı önermelerde bulunabilir, ancak bunlar genellenebilir bir tasarım rehberi oluşturamaz.

Sonuç olarak, bu çalışmada önerilen model, binalarla tanımlanmış dış mekanların kullanım değerini saptamak ve değerlendirmek için kullanılabilir, tasarım aşamasında tasarımcılara rehberlik edebilir ve gelecekteki araştırmaları yönlendirebilir. Aynı zamanda, bu model yalnızca uygulama alanında çalışan mimarlara, peyzaj mimarlarına ve kent tasarımcılarına değil; planlamacılara, psikologlara ve diğer sosyal araştırmacılara da yardımcı olabilir. Tüm bu disiplinler bu araştırmanın sonucu olan bilgiden yararlanabilirler.

**Anahtar kelimeler:** Binalarla tanımlanmış dış mekanlar, kampus çevreleri, kullanım değeri, eko-davranışsal yaklaşım, faktörler ve fiziksel nitelikler.



## 1. INTRODUCTION

"A close relationship between outdoor quality and outdoor activities can be noted. In at least three areas, it appears possible, in part through the design of the physical environment, to influence **how many** people and events use the public spaces, **how long** the individual activities last, and **which activity** types can develop".

(Gehl, 1987, p.39)

### 1.1. Statement of the Problem

In order to create a better fit and a harmonious relationship between human requirements and the corresponding built environment, it is essential to understand people's psychological and social responses to the environment. Yet often designers are unrelated to the people for whom they design till the socially oriented research and design has started; and till that time we seldom know and are seldom interested in who the people populating the space are, why they are there, and what they are doing there. Social science oriented research has been introduced into architecture by environment-behavior studies since the 1960's. This approach looks at the way people see and understand spaces, and how they perceive, use and interact with them. There is no doubt that the attention thus drawn towards the social and psychological attributes of the environment has enriched architectural discourse, both theoretically and professionally (Kallus, 2001). Today, social, behavioral and psychological research in design fields are receiving increasing attention day by day from researchers, attempting to define the nature of interactions between people and environment.

According to Lang (1987), in order to clarify the nature of the contribution of the behavioral sciences to environmental design, it is useful to distinguish between two types of theory; "*positive*" and "*normative*". Positive theory is mainly concerned with the nature of the phenomena, and can be created scientifically or, at least, quasi-scientifically. Normative theories, on the other hand, are statements on what should be done to make better worlds. Based on an ideology or world view, normative theory consists of overtly value-laden statements of philosophers, politicians, and architects, among others, on what ought to be. They involve the identification and explanation of statements of belief. For this reason, they themselves can not be scientific.



Standing at the intersection of a man-environment mutual interface and looking from the point of view of empiricist-positivist theory, this research examines the social life of enclosed public outdoor spaces, specifically taking campus outdoor spaces as case study settings. We know that all places are not the same; somehow some of the public outdoor spaces work for people, but some do not. And some draw more people than others. Thus, what makes those spaces inviting and livable? How people perceive, and use them? To be able to answer those questions, this research takes the issue mainly in that way: What are the possible factors which affect the social life that occurs in public outdoor spaces? How and to what degree do they affect livability?

These are the main issues this research wants to focus on. While doing this, I will be mainly dealing with the specific questions below:

- What kind of influences are there on the social life of public outdoor spaces?
- Do the factors that affect the social life of public outdoor spaces establish a model to evaluate livability?
- What are the links between specific use patterns and specific design features?
- How influential can the physical features be on user's behavior?

The physical environment provides the opportunity for interaction and experiences, thus consequently influences human's psychological states and behavior. In that manner, knowledge dealing with behavioral responses to the physical environment is crucial in order to arrive at a better fit between man and his physical environment.

Although social and economical diversity of a place draw many people to any public outdoor space, what really makes it an inviting and sociable environment are its physical built form and its elements. Many researchers stated that the scope and character of outdoor activities are greatly influenced by the physical environment. Indeed, environment enables and constrains activities; it can encourage some activities by making them easier to be carried out and discourage others by making them difficult.

On the other hand, places obviously vary in size, function, configuration, and in the detailed attributes. In this regard, the exploration of the environmental significance of the sites points to the some important aspects of urban environment such as landscape elements, man-made physical features, spatial layout, context, aesthetic-visual qualities and so forth.



According to Bechtel (1977), behavior is enclosed by architecture, with a more general term space. Thus, being one of the important attributes of a physical environment, enclosure with its sub-components, which are transition zones, spatial definition and boundary conditions, might have some effects on behavior-use patterns. While examining the important plazas of New York, Whyte (1980, p.26) stated that:

“.....my personal feeling is that a sense of enclosure contributes to the enjoyment of using plazas”.

Indeed, the perception of a presence of space enclosure in public outdoor spaces somehow increases social interaction. Conversely, the lack of sufficient space definition negatively influences it (Al-Homoud, 1996). Thus, the purpose of my research is to explore, in depth, the users' behavior patterns in enclosed public outdoor spaces, how they change with the physical conditions and the relationship between these behavior patterns and physical characteristics of public outdoor spaces. All these issues are obviously crucial in order to draw implications for the design of public outdoor spaces in future. They are all required to be able to encourage social life in these spaces and consequently to improve the quality of life between buildings so that these settings may provide pleasing, comfortable, supportive and beautiful places.

## **1.2. Historical Background: Outdoor Spaces' Role in Making Public-Social Life**

To be able to understand how important an outdoor space's role is in promoting public life, it is first necessary to look at the development of public-social life in public outdoor spaces beginning from the past.

According to Lofland (1973), public outdoor spaces as *“a world of strangers”*, is where primarily the drama of strangers in the midst of strangers is played out. Similarly, Carr et al. (1992) defined that public space is the stage upon which the drama of communal life unfolds. And it is here that we must look if we are to understand how the drama is played out. Thus, the basic function of public life in public space is to bring people together and help to create a more humane culture.

Even though the significance of public outdoor spaces and their role in making public-social life have long been ignored since the automobile age, they generally have made significant contributions to the life of urban dwellers up to now. Historically, different cultures have placed differing emphasis on the value of public spaces and balance between public-private domains is changing continuously. As

public life has changed, its settings - kinds of public spaces - in turn, have also changed; thus, new forms of public life require new spaces. This tells us that the relationship of public space to public life is dynamic and reciprocal. The diversification of public space types and their corresponding public life forms and settings have had both positive and negative influence on public life.

Starting from the eighteenth century, several such shifts have occurred both in the United States and Europe. Since the middle of eighteenth century, a gradual erosion of public life in cities has been observed. The rise of urbanism in the nineteenth and early twentieth centuries has had negative consequences on urban life. People's social life altered in terms of interaction and intimacy. During this period, because of the excessive isolation and fragmentation of buildings as freestanding objects, they have been defined by the concept of "*architectural individualism*" by Emil Kaufman (1968).

Most architects in the twentieth century have not been concerned with the spaces created by the arrangements of buildings, creating public outdoor spaces that are independent of the actual behavioral needs of the users. Spaces for human communication were ignored in the planning theory of twentieth century. Modernism and the private realm became one of the most essential elements in architecture. Carr et al. (1992) pointed out that, since World War II, successful public spaces have often had commercial purposes.

Since the late 1950's, there has been a proliferation of public space types to meet the needs of an increasingly stratified and specialized public life. Plazas, squares, pedestrian malls, flea markets, enclosed atria or gallerias, community gardens, new parks, farmer's markets, new walking streets and outdoor cafes emerged; especially over the past thirty years they have been built in all parts of Europe and the United States; most of these new spaces seemed to be well used.

Lofland (1973) and Sennett (1979) hold that there has been a substantial decline and loss of public life and the balance in our society is shifting strongly toward the security and pleasures of private life. However, others argue that the decline and losses of public life has been greatly exaggerated (Lennard & Lennard, 1984) and life in public spaces has increased remarkably (Cooper Marcus & Francis, 1990; Gehl, 1987; Lennard & Lennard, 1984; Whyte, 1980 & 1988).

Historical evaluation of public spaces has given us the wide variety of public space types existing today. The diversity of public space types reflects the multiple uses and the great importance of public spaces in our era's community-public life, as well

as establishing a sense of community. Researchers (Gehl, 1987; Cooper Marcus and Francis, 1990; Whyte, 1980, 1988) have pointed out that the number of people who use public outdoor spaces has been increasing in recent years. Users have also been specializing as a fact of contemporary life; today public and semi-public spaces have now become the special territories of different age groups or of different ethnic and cultural groups (Cooper Marcus and Francis, 1990).

According to Cooper-Marcus and Francis (1990), assumptions about today's public life and spaces are that, first, public life is thriving in the contemporary industrialized city; second, an important measure of the success of public open space is its use; third, that the use and popularity of a space depend greatly on its location and the details of design and lastly, that we must communicate what is currently known about the linkages between design, location and use.

Finally, according to Francis's (1989) point of view, today's successful public outdoor space is not only a usable space but also a lovable one. It is not only congruent with the user's behavior, but it also lets users have the right to get public control through participation and modification, and by attaching meaning to the space.

### **1.3. Objectives of the Research**

Considerable advances in public outdoor space research and design practice have occurred in the past decade. Case study researchers have used outdoor settings as laboratories for testing basic questions of use, perception and environmental meaning; utilizing especially "*a post occupancy evaluation*" approach, applied studies directly influenced the redesign and management of outdoor spaces (Francis, 1991).

Thus, in recent literature, we can find many works on the design of public outdoor spaces, some of which dealt with their use-activity qualities and life in those spaces, but very rare of which specifically dealt with the behavioral aspects of the public outdoor spaces by combining their psychological or symbolic implications.

This research was designed to examine the actual use of public outdoor spaces, and to interpret users' behavior in relation to exterior design features of enclosed outdoor spaces. Thus, its aim is to explore useful knowledge about enclosed outdoor spaces, which can improve our understanding in terms of their use qualities. It focuses on the knowledge of what makes livable public outdoor spaces,

knowledge of how people perceive and use them and knowledge of the behaviors that occur there.

The primary objective of this thesis is to test the stated hypotheses and to find out how influential the proposed model on the actual use of enclosed outdoor spaces. It also identifies physical elements of public outdoor spaces acting both as describers of the space and factors affecting their use patterns. In this respect, it is possible to briefly state the objectives of this research mainly in four stages:

- To understand, analyze and evaluate the concept of *“use value”*,
- To look into the relationship between the concept of *“use value”* and some presupposed factors, which were extracted from earlier research results and literature review; search for how, and to what extent it is dependent on these factors,
- To test the validity of the proposed model by searching the effects of these presupposed factors and finally,
- To obtain some implications, which make outdoor spaces inviting, attractive and nice; and raise the quality of life between buildings for the design of enclosed public outdoor spaces in future.

#### **1.4. Scope of the Research**

Where does the problem field of current study stand among architectural research and what is its relation to those theoretical studies? Relevant to these questions, the definition of scope is important in order to frame the domain of the subject.

A review of attractive public outdoor spaces shows that they influence social interaction between people by facilitating, blocking, separating and linking various individuals and groups within the space. This corresponds spatially to a public space's openings to an urban network, its enclosures, boundaries, spatial linkage and grouping between various parts, its size and circulation and the placement of activities within and around the space. With this idea in mind, it obviously relates to the design of the space and the ways in which physical elements are defined or articulated through architectural treatments.

In short, this problem area puts out an interplay between social contact in enclosed public spaces and the physical artifact of those spaces. When we think about the issue in a broader frame, it implies two important factors in an environmental design, one of which is related to human interaction, social life, communication,

human's social and psychological dimensions and the other of which is the physical dimension and the layout of an environment. This suggests investigating a number of important issues concerning social versus spatial values, which might be considered in the field of people-environment studies. Thus, the current study may have some benefits from the models of those studies. In this sense, it calls for a critical review of major approaches to human behavior, which reveal issues such as behavior settings, activity and perception systems.

Among a variety of outdoor spaces in existing literature, for the purposes of this study, this study specifically focuses on those of which are created by buildings. It is possible to see that different combination of words "*public-urban-open-outdoor space*" can be used to describe spaces between buildings. Each term stresses different aspects of them. And it also refers to public outdoor spaces which are in the form of urban plazas rather than streets. Thus, in this case study, the main focus will be given to the areas which are enclosed and bordered by buildings. Undefined, open outdoor spaces will not be considered for this specific study, since their use patterns may differentiate in comparison with the ones which are surrounded by buildings.

### **1.5. Significance of the Research**

Who uses and how they use public outdoor spaces and why it is a topic that has received considerable attention. In addition, the reasons why certain spaces are not used -non-used spaces-, or used in a different way from what designers or managers intended -misused spaces-, have been well documented (Francis, 1991).

The scope and character of outdoor activities are greatly influenced by the physical environment. Thus, we already know that physical environment affects life in public outdoor spaces. Researchers like Gehl (1987), Whyte (1980, 1988), Alexander et al. (1977) and many others have done a lot of work to study how physical features influence the use and life of outdoor spaces and have thus developed many concepts. Derived from an existing body of literature, there are a variety of factors-or variables of the research problem. However, what is missing is,

- Especially the concept of enclosure's effects,
- Each factor's effect on consequences (dependent variables) by keeping in mind the effects of other factors,
- The effects of the interaction between factors or variables on the consequences.

The main contribution of this research is to analyze the concept of enclosure in depth with all the possible components depending upon different points of views, so as to reveal its entire influence both directly and indirectly on outdoor space use. It will also bring all other variables together and analyze them in order to see how each of them and to what degree they affect the livability of urban outdoor spaces without losing the interrelationships between them. The anticipation from this research is to be able to see mainly the effects of enclosure, but at the same time the effects of other factors on livability of public outdoor spaces.

In summary, this current study considers all the possible factors together and looks into their effects jointly on the use value of either outdoor spaces in general or campus outdoor spaces specifically. At this point, it can make a contribution to existing research literature, since while there are many works, which studies all these factors separately, there is no specific study in the existing literature in this manner.

### **1.6. Contributions**

This research was conducted at campus outdoor spaces by applying the proposed analysis model to campus environments; since there seemed a lack of knowledge in existing literature which is specifically concerned with the use-behavioral aspects of campus outdoor spaces. Over the years, the accumulated knowledge about campus settings either has been about technical innovations and issues of form or large-scale planning, education policy and fiscal issues (Cooper-Marcus and Francis, 1990).

It has been expected that the findings and consequences of this research can contribute to a better understanding of the effects of physical and architectural features on the livability of public outdoor spaces in general, campus outdoor spaces in specific. In this way, this research can help to afford the quality of life on public outdoor spaces so that these settings may provide pleasing, comfortable and supportive places. Beyond understanding the physical features that make livable outdoor spaces, it is possible to draw some implications for the design of future public outdoor spaces. Research results can also be utilized to understand the role of campus outdoor spaces on campus life for the students.

In summary, this study can provide useful information for creating more successful public outdoor spaces by showing the way to be able to encourage social life and consequently to improve the quality of life between buildings. Thus, it may be



instrumental not only in the scope of design practice for architects, landscape architects and urban designers, but also in the area of planners, policy makers, psychologists and other researchers. They can all benefit from the knowledge, which have resulted from this research.

### **1.7. Organization of the Thesis**

Chapter one starts by introducing the problem based on the discussions of its historical background; it addresses the need to study public outdoor spaces. It also contains the objectives, scope and significance of the research and contributions of the current research to the existing body of literature.

Chapter two is a general literature review; which describes the theoretical underpinning's of the research. In order to make a useful starting point for this research, it provides a conceptual background for the present study's major constructs, which include environment-behavior interaction, an ecological approach, the theory of behavior setting, environmental cues, affordances, environmental meaning, perception and the theoretical relationships between these major constructs. Additionally, it defines the characteristics of enclosed public outdoor spaces, including space enclosure, how to measure it, transition zones as edge effects, the potential of public outdoor spaces to generate activities, attributes of activities that occur in enclosed public spaces and a brief review about campus environments.

Illustrating the logical structure of the study, chapter three discusses the research strategy and methodology developed to conduct the study. It describes research questions, hypotheses, both dependent and independent variables and potential confounding variables and the three major techniques that were used to collect the data, which were descriptive analyses, field observations and questionnaires. Lastly, it introduces the major analysis model of the dissertation in order to test by benefiting the case study examined in detail in chapter four.

Chapter four generally contains the evaluation of findings. It documents the selected settings by means of descriptive analyses, shows the analyses of the data in order to evaluate the major and minor hypothesis. The last chapter, chapter five, presents a discussion of the research's major findings and looks at the hypotheses after testing and answers research questions, finally it points to directions for the future both in research + theoretical issues and design + practice.

## 1.8. Conclusion

Needless to say, today the designer still needs to know what limits there are on how his/her designs can influence human behavior, which consequently affords social interaction between people. For this, it is required to incorporate the use of behavioral sciences into professional design practice. In that case, design professionals should encourage and support these types of research efforts.

Bearing in mind the fundamental relationships between space and social processes, one more comment is necessary. What the most important issue is, is to be able to apply theories, hypotheses with their evidence to design problems, namely to the real world. It is clear enough that unless theories are applied to practice, their value will always be open to discussion. Thus, from the very beginning, current research intends first to be congruent with the existing theories and then expect to have the implications and the consequences which might have results on design issues and thus practice.

Focusing on the problem of current research, it has been briefly stated what we know about the problem, what I want to know further, what I expect to find out and what we might do with the results in this chapter. It also discusses the contributions that this research can make to a new knowledge. Overall, this introductory chapter summarizes the general structure of the current study.

## 2. LITERATURE REVIEW

"We shape our buildings and afterwards our buildings shape us".

(Churchill, W., 1943; quoted  
from Holahan, J. C., 1978, p.1)

"Stop trying to reform people. Reform the environment and –if the environment is right- people  
will reform themselves".

(Venturi, R.; quoted from  
Strickland, 1997, p.1)

### 2.1. Introduction

The attempt in this chapter is to provide a framework and a theoretical base for thinking about the topic. The problem must be approached from the perspective of man-environment studies (environment-behavior studies), which is a humanistic discipline concerned with developing a new theory of environmental design. Thus, in order to place this research in a broader context and to explore the basis of the problem, it is necessary to review the current thought in those fields of people-environment studies, which are directly relevant to the problem at first hand. The conceptual models and theoretical definitions in this chapter establish the necessary context for operational definitions of the major and minor constructs of present research.

In order to outline the theoretical underpinnings and establish a philosophic framework for research problems, this chapter mainly outlines a current conception of the field by defining some key terms and concepts of the theory. It begins with a general look at environment-behavior studies and behavior-built environment interaction or mechanisms. After that, it turns to review two of the models in these studies, which are an ecological perspective and environmental affordances, noting the ways that the original work has been modified and expanded.

It attempts to identify the essence of ecological psychology as an empiricist-positivist perspective in the study of environment-behavior relationships, outlining its strengths, accomplishments, as well as its limitations and shortcomings. Then, it examines the key environmental concept of ecological psychology, called behavior settings, and at the same time, indicates how the physical and social environment is

inter-related. Afterwards, it examined environmental cues, perception and meaning according to their relations to behaviors toward making a synthesis. Finally, it reviewed some major attributes of public outdoor spaces in relation to activities and recent research on campus environments.

## **2.2. Environment - Behavior Interaction**

We are always in the environment to carry out and participate in certain activities, and we usually perform these activities with other individuals. This means that the environment is all around us, we are always participants in the environment, and also our presence in the environment is purposive. We interact with the environment over time and over space. The ways in which the environment and behavior interact generally may be reduced into three key processes:

- Environment provides perceptual stimuli.
- The built environment may also be a filter. For instance, a building allows in the light and fresh air which we require but keeps out the nasty noises and the rain.
- The environment encourages or inhibits interactions between individuals (Canter, 1975).

How much do our physical surroundings shape behavior? Certain elements of the environment, either social or physical-environmental, may reinforce certain behaviors; by contrast, some other elements of the environment may inhibit certain human behaviors. Some people may claim that the amount of variation in human response produced by the physical environment is minimal compared with that produced by the social, institutional or cultural environment. However, according to Canter (1975) a quantity of accumulated evidence suggests that the physical environment has much more relevance on behavior. In this respect, depending upon what behavior the designer wants to reinforce or inhibit, accordingly the environment can be constructed (Bechtel, 1977).

No doubt, there are links between aspects of physical environment and behavior. Environment imprints itself upon our physicality and spirit and we respond to them. In other words, there are some parallels between the patterns of behavior and the patterns in the physical environment. Behavior is shaped by the environment to a certain degree and thus people's behavior varies within the built environment. The idea of architecture or environment in its broadest sense and human behavior

influences one another is the major concern of environment-behavior studies. In this regard, the most pervasive question in this field is how the environment influences behavior and what interaction occurs in between the two.

According to Holahan (1978), Winston Churchill's remark, which was quoted at the beginning of this chapter, is incorrect and misleading. He claims that there is an implicit assumption in his comment that the effect of an environment on behavior is direct, passive, simple, and readily predictable. The human process involved in this interaction is dramatically active rather than passive. They were not simple but instead were intricate, subtle and complex.

Bechtel (1977) points out that not space but behavior is enclosed by architecture. Any designed setting, city, dwelling, or building is not planned to be empty. Architect or planner must know the purpose of his/ her design; exactly what behavior he/ she will enclose. Thus, once the behavior is understood, the design process will be more creative and satisfying than the design of empty spaces.

There is a significant effort to incorporate the literature and findings of behavioral sciences into design practice. Utilization of behavioral sciences in design professions is gaining much more importance day by day. Environment-behavior studies represent a pluralistic approach today; there are not one but many voices and a growing body of literature. As an interdisciplinary area, it has many impacts on areas such as, architecture, planning, psychology, and so forth. As one of those voices, ecological psychology is an interdisciplinary effort with links to other disciplines, some stronger and some weaker.

### **2.2.1. Ecological Approach**

One of the most influential empiricist-positivist perspectives in the study of environment-behavior relationships is the approach of ecological psychology. Among the models of environment-behavior interaction, such as the transactional and organismic views, the ecological approach emphasizes the nature of a mechanism that links people and environments and provides means for studying the spatial properties of human behavior.

The theoretical perspective of ecological psychology has an important premise; according to that premise, external environmental factors can affect behavior. In their discussions of ecological psychology, Barker (1968) and Wicker (1979) proposed an interaction between environmental conditions, people and their

behavior, this implies that the environment provides cues to indicate appropriate behavior for any particular setting.

### **2.2.2. How did Ecological Psychology Emerge?**

In the middle decades of the last century, Roger G. Barker and Herbert F. Wright first proposed an ecological perspective within North American Psychology as a divergent development. By the late sixties Barker had concluded that human environments could not be properly studied within the discipline of psychology. He called for a new "*eco-behavioral*" science that would permit the study of the natural units of the environment.

Over the years, its founders, Roger Barker and Herbert Wright have developed the concepts and methods. Later on, Barker's "*eco-behavioral approach*" was further developed and partially modified in some ways by some of his former students and co-workers, especially by Wicker (1979), but also by Bechtel (1977) and Gump (1987). Yet the conception of the field seems to continually progress.

Originally, ecological psychology emerged from the criticism of traditional psychology as being predominantly an experimental science. Barker & Wright and their associates pointed out the limits of laboratory experimentation. Because, traditional psychology knows little about how people behave outside of laboratories and clinics. As naturalists, they advocated an unobtrusive collection of descriptive data documenting everyday life (Wicker, 2002).

Finally, they were convinced that psychology needs an ecological perspective. Thus, Barker initiated a psychological ecology that aimed to describe and analyze naturally occurring behavior in its natural surroundings (Kaminski, 1991). As it is evident that in those forming years, they used the term "*psychological ecology*", but this was later changed to "*ecological psychology*" in the 1968 book.

Research at the Midwest Field Station carried out by Barker (1968) was a starting point for developing "*ecological psychology*". In these formative years, he and his colleagues examined children's behavior in real-life settings and the characteristics of their real-life environmental conditions. What they found was that it is possible to predict some aspects of children's behavior more adequately from the knowledge of the behavior characteristics of the drugstores, arithmetic classes and baseball games they inhabited, than from the knowledge of the behavior tendencies of particular children. Barker concluded from observing children that it was important



to learn more about the contexts in which behavior occurs. Barker & Wright were the first to emphasize the environmental dimension of behavior and to believe that environment and behavior are inseparable. As Bechtel (2000, p.62) quoted from Skinner (1972, p.185):

"People are extraordinarily different in different places and possibly just because of the places".

Those thoughts were radical statements at that time since traditional psychology as a profession believed that the origin of all behavior is in the head. In fact, Barker said that:

"It is more important to go the place where behavior occurs than it is to look inside the head" (quoted from Bechtel, 2000, p.62).

Pioneered by Barker & Wright, ecological psychology has produced a great body of findings and literature from the Kansas School up to now. But perhaps the most important contribution of ecological psychology to environmental psychology is the identification of a natural environmental unit, the behavior setting and the formulation of a theory of behavior setting functioning (Wicker, 2002).

### **2.2.3. Why Ecological Psychology?**

Contextual research is distinguished from non-contextual research by the involvement of concepts and a set of assumptions about the objective environment, the subjective environment, and the relationship that exists between them. Fuhrer (1990) mentions the existence of the ecological-psychological gap. It was characterized by many authors as the inside-outside problem, and was recognized as a gap between the psychology of persons and the operations of ecological environments.

In order to handle this gap problem, the establishment of a new discipline called psychological ecology was required. Indeed, there was a need for identifying physical, social, and temporal dimensions of settings as they shape people's actions taken within those settings. At this point, a full understanding of behavior and its environment depend on both ecological psychology and eco-behavioral science, which is independent of psychology.

According to Bechtel (2000), the basic assumption of ecological psychology is that the person is not the basic unit of human behavior; instead, the most basic unit is the behavior setting. It assumes that both physical environment and behavior are

inextricably bound together. Barker's unit of behavior, that is the behavior setting, is described as "*supra-individual*", that means it goes on regardless of the individual. This is clearly the other way of saying; it forces more on the issue of examining variables outside the person. Ecological psychology focuses on behavior settings that are the part over which the designer has direct control. This is the most significant feature of it, which pertains to environmental design disciplines. Obviously as designers, physical features and arrangements in settings are the part in which we are most interested in.

Its applicability to the design problems is at a much higher stage as compared to other approaches in environment-behavior studies. It is evident that the designers need to know how his/ her design can influence human behavior. For example, Bechtel (1977) suggests that a behavior setting survey, which is the only known comprehensive way to master design elements of behavior, is especially useful to obtain such data. And as he points out that behavior for architectural programming is best studied by the techniques of ecological psychology including K-21 scale and the behavior-setting surveys.

As a consequence, the strength of the environmental determinist perspective, that is ecological psychology, is that it indeed focuses attention on the environment.

#### **2.2.4. What is Meant by Ecological?**

The term "ecological" reminds us of two approaches; one is Gibson's ecological approach related to perceptual processes and the other is Barker's and his associates' eco-behavioral approach.

While appropriating the term "*ecology*", both Barker and Gibson are influenced by biological concepts and perspectives. Their common denominator is the intent to describe, analyze, and explain the behaving and the functioning of human organisms in natural living conditions. Barker initiated a "*psychological ecology*" that aims to describe naturally occurring behavior in its natural surroundings. Gibson developed categories for the description of the environment on an ecological level, and innovative conceptualization of the functional interrelatedness of environment, perception and action (Kaminsky, 1991).

Overall, using ecology as a metaphor, the term "*ecological*" emerged from an analogue to ecology in biological science. It signifies a specific methodological orientation, which benefits from observing natural behavior in natural surroundings

by means of this analogy to biological ecology. Moreover, ecology means “*objective*” with respect to the surrounding conditions, as opposed to “*subjective*”, cognitively represented environment.

#### **2.2.5. Environment in Ecological Psychology**

The term environment is widely used today for different purposes. Having a broad range of meaning both in everyday usage and in the social sciences, it is obviously a very ambiguous term. It is important, therefore, to state clearly at the beginning how the term is to be used in these current reviews.

Generally, the term physical environment has several dimensions. First of all, whatever the purpose is, the key attribute of the definition of environment is that environments “*surround*”. An environment can be infinite in scope unless it is bounded in some way (Conyne and Clack, 1981).

The physical environment can be subdivided into (1) the natural environment and (2) the built environment. Natural environment refers to places and geographical features, such as mountains, valleys and oceans; environmental conditions such as temperature and rainfall; and flora and fauna.

On the other hand, built environment refers to the results of people’s alterations of environments—for example, homes, cities, communities, and farms (Altman & Chemers, 1984). Another dimension also concerns the scale of environments. According to Zeisel (1995), an environment has not only a physical but also an administrative setting; it has some social attributes which have an influence on the way people live, work and play.

Erkman (1982) emphasizes one of the most important attributes of ecological environment, that is, since environment is formed as a consequence of interaction between humans and settings, it is evident that it can not be explained adequately, only by examining either humans or settings. At this point, ecologic model takes the environment as a holistic system in which humans and settings interact with each other.

At an ecological level, what architects create is a potential environment for human behavior. Thus, the behavioral environment consists of the cognitive image of the objective environment that forms the basis for behavior (Lang, 1987). Actually, a different conception of the environment is provided by ecological psychology. Ecological psychologists believe that the environment is well-structured and

consists of a series of nested, hierarchically ordered systems that fit together somewhat like the layers of an onion. Each system is a component of a larger system, and each contains a number of component systems within its boundaries. So, a system that is a component at one level is therefore an environment at another level. Schoggen (1989) summarizes all the attributes of an ecological environment using the definition below:

"Ecological environment is the objective, preperceptual context of behavior, including both social and physical-geographical-temporal components of the real-life, everyday settings within which people engage in goal-directed, purposive behavior" (p.382).

The last point that needs to be stated is that the useful distinction between the two parts of an ecological environment, that is the "*immediate ecological environment*" and the "*remote ecological environment*". He asserts that the first one is the surroundings represented by behavior settings, which is structured or ordered, and therefore knowable; whereas the latter often extends without limit into the spatial-temporal surround (Barker, 1987).

#### 2.2.6. Ecological Psychology

As originally developed by Barker, Wright and the Kansas group (e.g., Barker, 1968), the ecological perspective on environment-behavior studies represented an approach to the descriptive study of behavior in terms of behavior settings (Wohlwill & Heft, 1987).

In the ecological psychology of Barker (1968) and Wicker (1979), environment and behavior are truly interdependent, even though the emphasis is placed on environmental variables. According to the essence of this empiricist-positivist perspective, behavior is under the control of the environment. By this, it is meant that when environmental variables and events are defined and their functions understood, human behavior presumably becomes predictable. In this regard, Wicker (1979) defines ecological psychology as follows:

"Ecological psychology is the study of the interdependent relationships between the goal directed actions of persons and the behavior settings in which these actions occur" (p.16).

As an example of an extreme environmental determinism, ecological psychology suggests this relationship, which is represented by the equation of  $B = f(E)$  (Winett, 1991). This conceptualization is shown in Figure 2.1, which is a very general model describing a flow-through process till behavior settings.

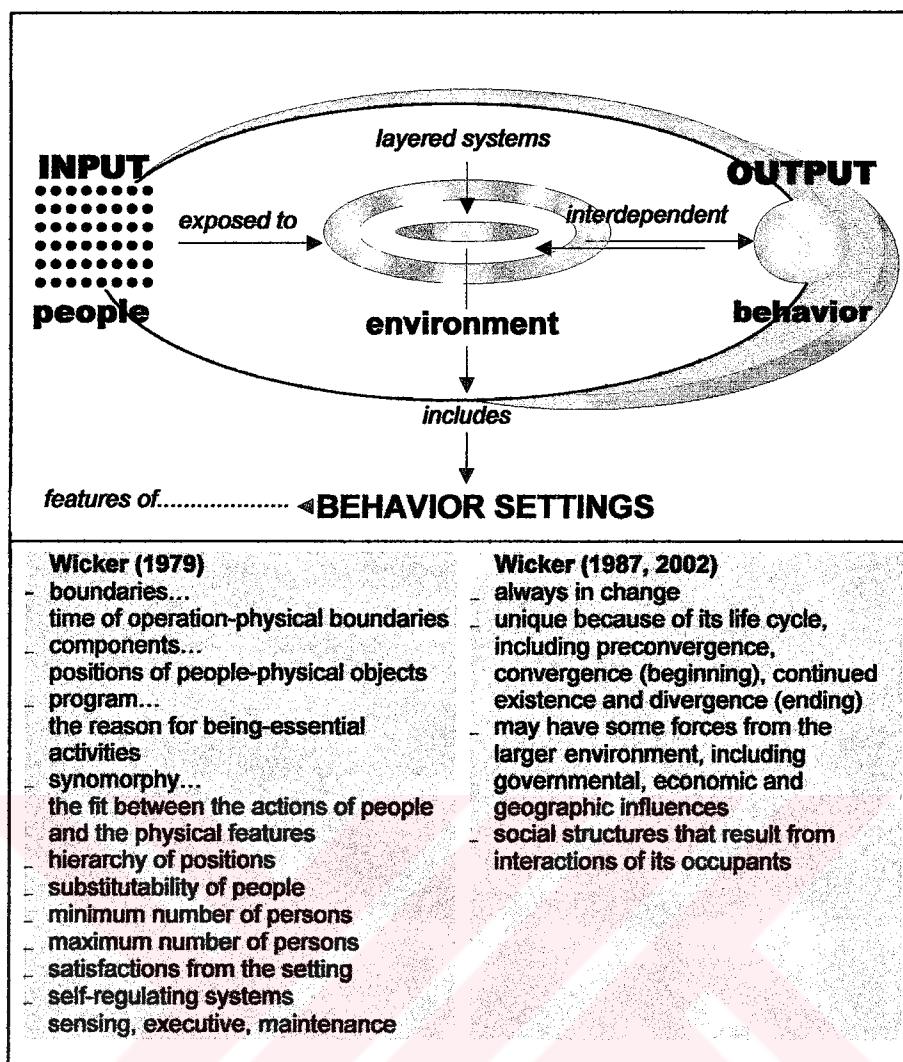


Figure 2.1. A schematic diagram, which explains the general framework of ecological psychology and behavior settings based on Barker, Wicker and other co-worker's theories (1979, 1987 and 2002).

In ecological psychology, human behavior is a very regular and predictable phenomenon. As Bechtel (2000) said:

"If one goes to the places where people live and watches without interfering, behavior is seen to be regular, predictable pattern" ( p.63).

He further explains that people tend to behave in the same from year to year in the same places. There are changes, of course, but these tend to be insignificant in the larger pattern. Winett (1991) also emphasizes this issue. According to him, behavior is not unique to particular individuals, but may be distinctive to one or more settings. In this respect, physical environments, which elicit similar behaviors, are also similar from place to place. For example, if you enter the reading room of a library then you should be quiet.



According to an ecological viewpoint, time, place and behavior are all tied together and inseparable (Bechtel, 2000). In this regard, it is mainly concerned with how people's behavior and experiences are related to their everyday environments. Thus, the essence of this view is of course that it considers behavior in context (Wohlwill & Heft, 1987). Although ecological psychology would not deny the larger context, its focus is not the larger one; rather it would insist that all influences are mediated within and through the behavior setting boundaries (Bechtel, 2000). On the other hand, relevant to this issue, one of the major problems of ecological psychology is that:

"Among the limitless attributes of a person's surroundings, which ones are relevant to her/his behavior, how does one identify and measure them?" (Barker, 1968, p.1).

In actuality, the major focus is on the influence of behavior settings, on the behavior of large numbers of people, which are collective behaviors (Winett, 1991). People are but one component of the larger behavior setting system, which restricts the range of their behavior by promoting and sometimes demanding certain actions and by discouraging or prohibiting others.

Overall, in order to deeply understand the relationship between people and the built environment, one needs to understand first the relationship between behaviors and settings.

### **2.2.7. Behavior Settings (BS)**

Ecological psychology provides the concept of "*behavior setting*", which is essentially the same as "*activity-space*". The "*behavior setting*" (BS) is the central and core environmental unit of ecological psychology (Barker, 1968). It is a common phenomenon of everyday life, which occurs naturally; or a system of happenings on the scale of retail shops, court sessions, offices, academic classes and so forth. A behavior setting represents interplay between standing patterns of behavior and physical environment. Thus, it has both an environmental and behavioral aspect. In this regard, a relatively unique aspect of this perspective is that behavior settings are treated as existing sociophysical entities (Winett, 1991).

Roger Barker's work (1968) provides the conceptual framework for this. An environment consists of a set of behavior settings that afford certain behaviors and activities. Behavioral settings are stable combinations of activity and place set in a specific period of time. What is perceived by one user may be different from that of other users in the same settings because of different perceptions and needs. Thus,



behavior settings explain place-specific behavioral patterns, and provide a rich framework for analyzing human behaviors and the nature of individual and group differences (Lang, 1987).

All behavior must take place within a behavior setting. And there is no behavior “outside” a behavior setting. The context of behaviors defines and prescribes the behavior independent of individual differences. This does not mean that there are no individual differences; rather it is to say that they become redirected by the setting program (Bechtel, 2000). Wicker (1979) summarizes some of the essential features of behavior settings in a single sentence:

“A behavior setting is a bounded, self-regulated and ordered system composed of replaceable human and nonhuman components that interact in a synchronized fashion to carry out an ordered sequence of events called the setting program” (p.12).

In brief, a behavior setting is considered to be a stable combination of activity and place. It is characterized by:

- A recurrent activity- a standing pattern of behavior,
- A particular layout of the environment-the milieu,
- A congruent relationship between the two- a synomorphy,
- A specific time period (Barker, 1968).

A standing pattern of behavior is such a behavior that occurs over and over again in a given place and at a given time. Namely, it is possible to go to the place where it occurs and see the behavior repeated each time the setting happens. For example, a sports stadium as a behavior setting has a physical structure (a particular field, seats, lights, that is the milieu) and a cultural purpose (entertainment as a recurrent activity), and this behavior setting represents an interplay between standing patterns of behavior and a physical environment (a synomorphy) (Winett, 1991). According to Barker (1968) a behavior settings consists of,

“....one or more standing patterns of behavior-and-milieu, with the milieu circumjacent and synomorphic to the behavior” (p.18).

First Barker (1968) and later on Wicker (1979) and Bechtel (1977) have presented in detail a methodology by which to identify and categorize behavior settings. According to Wicker (1979), all behavior settings share a number of essential features:

- Behavior settings are active, organized and self-regulating systems. They should not be thought of as passive backdrops where people carry out

actions. Essential people and materials are drawn into settings, and disruptive components are modified or ejected.

- Behavior settings impose their “*program*” of activities on the people and objects within them. In this regard, people usually enter into a behavior setting for a reason; there is some goal or satisfaction that the setting provides.
- Behavior settings contain two broad classes of components; human and nonhuman (that is the hardware of the settings), which are completely surrounded by a boundary. There is, within this boundary, a pattern of behavior that follows a program – a prescribed sequence of interactions between people and objects in the setting.
- Behavior settings maintain their stability due to the operation of a variety of regulatory mechanisms, such as “*sensing, executive and maintenance*”.
- Behavior settings are the most behaviorally significant and the most immediate environments of human behavior; that is, they are the environments that provide instant inputs to people.
- Behavior settings have a “*synomorphic*” relationship between their components. The actions and objects fit compatibly together, that is to say this combination of coordinated components are called a “*synomorph*”. These close linkages between behavior setting components are responsible for the coherence or unity of a behavior setting.
- Behavior settings are “*real*” and “*tangible*”. Their time and place boundaries can be pointed out precisely.
- Behavior settings depend on a minimum, also a maximum number of people to carry out the activities essential to the setting, that is, when the number of people presented is either too small or too large to permit a setting to function normally, adjustments must be made.
- Behavior settings have the substitutability of people within them. People are replaceable and interchangeable components of settings.
- Behavior settings have “*sub-settings*” within them. These sub-settings are highly interdependent. This means that a change in one will produce, to a specified degree, a correlated change in the other.
- Behavior settings do not only have definite relationships to one another, but also to the physical environment and to the social structure in the community. Even though they are defined as separate entities or discrete units of behavior, they are also a part of the flow of behavior in a community. Thus, when the community changes, settings also change (Bechtel, 1977).

Behavior settings also contain boundary markers that may be symbolic, depending on the behavioral pattern or the needs. Clarity of boundaries within and across groups solves conflict and affords certain behaviors. Behavior settings form activity systems that embody people's motivations, attitudes and images about the environment within given constraints such as income, norms, competence, mobility and so forth.

A rich environment affords rich activity systems and patterns. Different structures and patterns of the physical environment afford different behaviors for different individuals and groups depending on perceived rewards and costs. As dynamic processes, behavior settings invite desired patterns of behavior and request adaptation of others (Lang, 1987).

According to Bechtel (1977 & 2000), an interesting fact about behavior settings is that the ordinary person in any culture is able to recognize and describe them. They are the repeated events of every day life, like the meetings, school classes, offices, houses, stores, games, the streets and sidewalks, in short the catalogue of all the behavior that takes place in a community. This makes it possible for the observer to use any participant of behavior settings as an informant.

Erkman (1982) emphasizes that behavior settings are in our daily life and many of the words we use describe these settings. Words we used as symbols of these settings include their many properties, which are both behavioral and physical. The examples below, which are the dictionary definitions of a few words from daily life reveal these aspects.

**"Park:** A tract of ground kept in its natural state, about or adjacent to a residence (physical aspect), as for the preservation of game, for walking, riding, or the like (behavioral aspect)" (Webster Dictionary, 2004a).

**"Shop:** A building or an apartment (physical aspect) in which goods, wares, drugs, etc., are sold by retail (behavioral aspect)" (Webster Dictionary, 2004b).

**"Pavement:** A floor or covering of solid material (physical aspect), laid so as to make a hard and convenient surface for travel (behavioral aspect); a paved road or sidewalk (physical aspect); a decorative interior floor of tiles or colored bricks (physical aspect)" (Webster Dictionary, 2004c).

Previous research on behavior settings has been conducted in publicly available places and activities, for example, grocery stores, court sessions, high school basketball games, Rotary club meetings; and community settings like schools, churches, hospitals, a national park, an office of a state policy agency (Wicker, 1987).

Continuous change and progress in human communities lead to both a harmony and discord between human and settings. In this respect, the dilemma of harmony and discord is one of the major aspects of the environment. When we analyze behavior settings as sub-units of environments, we naturally encounter this dilemma again. From this point of view, it is valuable not only revealing synomorphy, fit, contingency or congruence but also contradiction, conflict or inconsistency between physical and behavioral aspects of behavior settings (Erkman, 1982).

Current conception of the field is different from the original work in some ways. For example, Wicker (1987) suggested a more expanded perspective about behavior setting theory, which contrasts in numerous ways with the traditional view. In this framework, he considered the creation, growth, differentiation, decline and termination of settings. As being an alternative to the traditional conception of behavior settings, he suggests the followings in the revised conception:

- Behavior settings have developmental cycles, including a beginning and an ending.
- Behavior settings are linked not only to the people and the behavior within them but also to other settings and to the conditions in their larger social-physical environment.
- Behavior settings are social structures that result from the interactions of the occupants and thus are influenced by their founders.

Further modifications and elaborations have been suggested by Wicker (2002). His current conception mostly reflects the internal dynamics of settings. These modifications, which makes much more being completed the conception of behavior settings, can be summarized as followings:

- Behavior settings can be represented in terms of the sense making processes of setting occupants, which reflects the internal dynamics of settings. In this regard, it is possible to include some general psychological processes in the operational process of behavior settings (Wicker, 2002).
- Behavior settings are always in change. They are continually constructed and reconstructed by participants on a moment-to-moment, hour-to-hour, day-to-day basis (Wicker, 2002).
- Every new behavior setting is unique because of its life cycle, which is constituted in stages such as *"preconvergence"*, *"convergence"* (beginning), *"continued existence"* and *"divergence"* (ending), as Wicker (2002) named them in his current conception.

- Behavior settings may have some forces from the larger environment including governmental, economic and geographic influences (Wicker, 2002). Namely, these effects are the relations of settings to a larger normative system.

Finally, the most practical value about behavior settings is that they are resources of data for new design - research problems. Physical and behavioral data which are obtained from analytical examination of behavior settings can be used in new theoretical-practical problems in future (Erkman, 1982).

### **2.2.8. Significant Variables of BS**

**Qualitative variables** in ecological psychology are generally properties of the organizational and physical aspects of the setting. Some important ones can be summarized as the following:

**Boundaries** of BS are where the behavior stops. When BS boundaries are not obvious, such as a change in floor texture, and not recognizable to some individuals, boundary problems arise (Lang, 1987).

**Layout** of the environment affects behavior and patterns of interaction between people in many ways. The crucial point here is to understand how the layout of an environment affects our images of it, and how these in turn affect and are affected by spatial behavior patterns.

**Size**, which is simply defined as the overall capacity or the size of the living unit, is one of the significant variables of behavior settings. Size variations of environmental units have a definite bearing on the quality of behavior and its effect on the behavior of the person in any context.

For example, Gump (1987) found that schools are susceptible to various sizes. According to his findings, students tend to have more activities and exhibit better attendance at events in smaller schools as opposed to larger ones. This result has been verified in other entities like churches, work places and small towns.

According to person-unit size interaction, Bechtel (2000) also points out that smaller organizations tend to make the people in them feel more important, more necessary and more obligated to do a job well. Therefore, while smaller settings tend to include people more in their events and make more demands on the inhabitants, larger settings tend to exclude and make less and different demands.

Quantitative variables of BS's, which are frequency, duration, population, occupancy time and occurrence, on the other hand, can be summarized as followings (Bechtel, 1977):

**Frequency** is the number of times a setting occurs within a given time reference, usually a year.

**Duration** is the number of hours a setting lasts during a year.

**Population** is the total number of people who enter the setting.

**Occupancy time** is the man-hours spent in each setting by each population group.

**Occurrence** is the number of days in which setting operates.

### 2.2.9. Methods for Identifying BS

Ecological psychology attempts to describe systematically the influence of key community settings on collective behaviors. Accordingly, for the most part, the research approach remains descriptive (Winett, 1991). There are many ways behavior settings can be measured, analyzed and discriminated. The significant methods of ecological psychology are outlined as follows:

**Behavior specimen records:** Behavior specimens are simply observations of daily behavior (Bechtel, 2000). It is person centered, since observers record a specific person's activities for an entire day (Wicker, 2002). Due to its time-consuming attribute, this technique requires having a team of observers. It can have great utility if one wants to show detailed use of a given environment (Bechtel, 1977).

**The behavior setting survey:** This method is a systematic way to collect data on behavior settings and their relationships. It is an observational technique which is a complete catalogue of behavior indexed to locations, times, frequencies, populations, age groups, intensities, and a complex of other details. And it basically measures what people do with design features (Bechtel, 1977).

Bechtel (2000) sees the behavior setting survey as the sole method of ecological psychology, since the behavior specimen method was dropped and taken up by very few. In a behavior setting survey, the prime unit of human behavior is the behavior setting. Even though it is a difficult method to learn, Bechtel (1977) emphasizes that it has two important advantages to other methods. The first one is its directness in collecting valid information and the second is that it is the only method, which is equally applicable to a wide range of scales, from a room to a whole community in which behavior can be objectively quantified.



On the other hand, it has one important disadvantage, that is, it is a time-consuming method, since a setting survey generally requires a period of one year. Yet in some situations, especially for many specialized purposes, setting surveys can be done in shorter periods of time (Bechtel, 1977).

**The narrative method:** It is a continuous account of goal-directed activities by an observer (Wicker, 2002).

**K-21 scale:** Use of K-21 scale makes it possible to discriminate one behavior setting from the other. This scale has seven measurable criteria. These include:

1. People who enter into both settings,
2. Leaders common to both settings,
3. Space common to both settings,
4. Objects common to both settings,
5. Behavior common to both settings,
6. Behavior in one setting influenced by behavior in the other setting,
7. Time common to both settings.

In order to determine the degree of interdependence of two behavior settings, they were measured according to each of these criteria on a 7- point scale. If the score reaches twenty one they are considered separate, but if K-value is below 21, then the two settings are combined into a single setting (Bechtel, 1977).

In the domain of ecological psychology, except for the methods explained above, other studies such as archival research, interviews, and surveys provide useful information for interpreting the cases as well.

#### **2.2.10. Criticism of Ecological Perspective**

Doubtless, the work on behavior settings also has had its critics, even though it has never proclaimed itself capable of explaining all human behavior. According to the different points of views, the criticism which has been made about ecological psychology up to now basically have three major points:

Firstly, it is possible to criticize ecological psychology for failing to consider how cognitive-person variables can mediate the effects of behavior settings (Winett, 1991). And there is no need for person variables in this equation. Some commentators mention its neglect of an individual system, including cognition, motives, personality and emotion (Price, 1990).

Secondly, even though environmental determinism perspectives force the focus away from the individual to environmental settings, and organizations; ecological psychology may represent too limited an environmental perspective. The limited scope in ecological psychology pertains to the analysis of only certain organizational and physical variables to the exclusion of other variables (Winett, 1991).

A group of German scientists also point to the limitations of ecological psychology's concepts and methods for capturing the complexity of everyday reality, including the social and cultural contexts beyond a behavior setting (Wicker, 2002).

Gold (1980) also points to the issue, that is, the extent to which patterns of behavior can be influenced by a manipulation of spatial design. He mentions different research results and the polarity among them; some prove the power of physical forces; whereas others provide some evidence about the power of social-psychological factors. So, according to him, there is a real disagreement over the role that physical design can play in shaping behavior.

At this point, Gold (1980) states that the truth would seem to lie between the two, in that design may be able to have an influence over behavior in certain tightly constrained circumstances. Further, on the contrary to the environmental determinist approach, he emphasizes the role of cognitive processes. According to him, the probability of any behavior taking place needs to be seen as a complex function of the cognitive processes and variables that intervene between man and the spatial environment; by stating again Mumford's dictum that *"to set the stage is not to write the play"* (p.241).

Thirdly, its organizational aspect is much more influential than its environmental aspect. The greatest amount of research from this perspective has been based on *"manning"* or *"staffing"* theory, which examines organizational aspect of behavior settings and not physical- environmental variables (see e.g. work of Wicker & Kirmeyer, 1976). Therefore, its focus has been on the effects of certain organizational and to a lesser extent physical variables on human behavior (Winett, 1991).

The Kansas group tend to define settings in molar terms, frequently in terms of the function served by the setting (e.g., church, school, etc.), without much attention to the specific physical characteristics of the setting. Yet such characteristics may provide important cues that serve to control or guide the behavior of the users (Wohlwill & Heft, 1987).

The last criticism and according to Winett (1991) the most important one, relates to its utility. He points out that when a setting is analyzed properly in ecological psychology, it is not clear what should be done with the data. Likewise, Bechtel (1997) claims that even though ecological psychology has had a large influence, its influence has been more by citation than through actual application of the methods.

#### **2.2.11. Public Outdoor Spaces as BS**

After examining all essential features of a behavior setting theory, it has been obviously noticed that there are some specific difficulties in applying a behavior setting concept to public outdoor spaces. What initially appear are organizational problems; that means outdoor spaces may not have a specific activity program all the time.

There are some examples of looking into public outdoor spaces as BS. For example, Bechtel (1977) focused on the sidewalks as BS. Taylor (1987) proposed street blocks, that is, both sides of a street between two cross streets, be studied as behavior settings. Wicker (1979, 1987) examined a national park as behavior settings.

While examining child behavior in an outdoor environment, Wohlwill and Heft (1987) stated that the spectrum of behavior to be observed in an outdoor environment differs from which can be encountered indoors. The main attribute of differentiating outdoor from indoor settings is their generally less structured character, in terms of the physical layout and arrangement of significant elements and the behavior appropriate to and supported by settings.

Lang (1987) gives some examples from plazas and city squares as behavior settings, while explaining the concepts of adaptability and flexibility in behavior settings. These terms bring the idea that a behavior setting may afford different standing patterns of behavior at different times without requiring physical change. That means a standing behavior pattern can be changed and is not totally dependent on the physical setting. However, a particular layout often affords one activity better than other. For example a stadium can be used for holding a religious meeting or a concert (Winett, 1991), but it supports a football match better than other activities.

Depending upon both Barker and Lang's books, public outdoor spaces can be examined as behavior settings, even though the activities in public outdoors are not

so as recurrent as indoors, on the contrary they are easily changeable or adaptable. Additionally, according to Barker (1968), open spaces may have an invitational quality. Thus, even if they do not have a specific program, they may have a heavily invitational quality for certain activities. It is related to the perception of environmental affordances (see the title of environmental affordances). For example, an open space invites a child to run, or an adult to take fresh air, steps afford sitting and fountain affords cooling-off.

### **2.3. Environmental Affordances**

Another major contribution to both psychology and environmental design theory is the concept of affordances, which is a simple yet powerful concept. It is also one of the crucial concepts of this dissertation, which is required for the argument. The ability to perceive some of the affordances of the environment seems to be innate or a function of the physiological maturation of people. The affordance perspective in environment-behavior relations considers the environment as a set of affordances. The affordance of the environment refers to the behavioral possibilities of the structure of that environment.

The concept of affordances was developed by J.J. Gibson (1966 & 1979) in the context of his perception theory. He simply stated:

"The affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or ill" (Gibson, 1979, p.127).

Affordances are basically features of the environment, which are identified because of their functional significance. Besides this, they are ecologically real, not mental representations of the environment. They are, in other words, objective; not appearances, but facts. For example, water affords drinking, air affords visual perception, reflective and sparkling surfaces afford optical information about water presence, or in other words; places where we can sit because they have sit-onable qualities, places where we can run because they have run-onable qualities and so on (Bechtel, 1997).

According to this view, the fundamental relationship between environment and people is based on affordances which refer to the aspects of an environment that allow or support activities. Affordances are defined by their meanings, that is, their functional possibilities to the perceiver. In this regard, different patterns of the built environment afford different behaviors. The affordances of the environment thus

limit or extend the behavioral choices of an individual depending on how the environment is configured. In other words, the built environment both supports some behaviors and restricts others.

Affordances point to the world's features, which are meaningful for an active perceiver. They are claimed to possess two distinctive and seemingly contradictory characteristics: First, they are relational properties, and second, they are properties of environmental features existing independently of a perceiver.

Affordances are specified relative to an individual perceiver. This implies that a feature of the environment may present certain affordance possibilities for one individual, but not for another. This variable quality of affordances is one of the features that make it a peculiar, and hence controversial, descriptor of the environment (Heft, 2001).

Properties such as mass, number, shape and location in space and time are invariant across different perceivers. Their constancy suggests that these properties are the attributes of the object itself, describable independently of any single individual's viewpoint. These qualities of objects often designated as "*objective qualities*". In contrast, there are other properties of objects, which are inconstant and varying between perceivers. For example, different individuals may experience the degrees of warmth-coldness of the same object differently. Hence, qualities of warm-cold, odor, taste and color are considered to be "*subjective qualities*" (Heft, 2001).

The concept of affordance is related to some earlier concepts (Lang, 1987). For example, architect Louis Kahn used the term "*availabilities*" and landscape architect Lancelet Brown the word "*capabilities*" in much the same way. Koffka suggested that objects have a "*demand*" or "*invitational quality*". Kurt Lewin also used the term invitational quality (Lang, 1987). As it is clear, all these concepts defines the same quality of environment.

The concept of affordances expresses a complementarity between a human being and an environment, like behavior-milieu synomorphy in ecological psychology. According to Heft (2001), there are some commonalties between Gibson's concept of affordances and Barker's concept of behavior-milieu synomorphs. The affordance of a place corresponds to the characteristic, behavior-relevant features of the milieu of a behavior setting (Kaminski, 1991). Each concept brings into a joint ecological framework quality that is distinctive and vital. At the same time, each concept enriches the other.

## 2.4. Environmental Cues

The physical environment is a network of environmental cues that affect people's choices and behaviors. In order to better understand a place's environmental quality and how people perceive and use these places, we first need to understand those physical-behavioral cues.

Consciously or unconsciously we interpret our physical environment in a variety of ways. In our daily life, we use physical cues to make judgments about people and places. For example, we infer that people are intelligent, creative, wealthy, warm, or poor, weak, immoral from their hair and dress style.

Likewise, the built environment transmits nonverbal messages to people by means of its physical elements. Having been designed to support specific activities, environmental cues will tell people what activities should occur in a space. In this regard, cues should define settings where activity or groups of activities should occur. In other words, these messages convey certain cues that are perceived differently by individuals and elicit appropriate behavior (Sanoff, 1991). People, then, read environmental cues, make judgments about the occupants of settings, and act accordingly (Rapoport, 1982).

Indeed, those cues can have an important influence on people's perceptions, attitudes and behavior, since they have both social and psychological implications. Cues serve the purpose of letting people know in which kind of domain or setting they are. For example, in conceptual, taxonomic terms whether front-back, private-public, men's-women's, high status-low status; in more specific terms whether a lecture hall or seminar room, living room or bedroom, good or ordinary shop and so on. So designers must understand the kinds of associations different people make to design elements and how these associations and interpretations of physical cues affect people's feelings, their relationship to the community and their ultimate behavior (Becker, 1977).

Perceptual information can be organized into three categories: "*operational*" -that which is needed by people to attain their goals; "*responsive*" -the distinctive characteristics that intrude into actions; and "*inferential*" -that which forms the basis for a coding system for recognizing elements of the world (Lang, 1987).

Ruesch and Kees (1956) were the first to suggest that a building is a form of nonverbal communication. They also used the term "*object language*" in regard to



all kinds of material things in terms of the way in which they display symbols either intentionally or unintentionally to set the scene for social encounters and likewise Bettelheim (1974) called it "*silent messages*" which they convey through the minute details of the physical environment.

Associations change with time and may differ considerably between different people. When the environment provides cues for expected behavior, that is people know what behaviors are expected from them, then the environment can be qualified as "*legible*". The physical environment, thus, reflects underlying social norms and values by conveying messages about status, values, tastes, leadership and appropriate behavior.

According to Becker (1977), a physical cue can be seen by different people, interpreted the same but with different meaning. The social meaning on the groups or individuals associated with the environmental message is very different than it is for groups who may form their identity by not being associated with the same physical cues. This is for the reason that in a pluralistic society where there is no single unifying set of values, the physical environment inevitably presents contrasting and conflicting images. The kinds of conflictions, as Becker quoted from E. T. Hall (1966) are described as a consequence of misinterpretation of nonverbal attitudes communicated through the physical environment.

## **2.5. Environmental Meaning**

Meaning is a central concept and critical to an understanding of how an environment works. Doubtless, there are many levels of meanings and many theoretical approaches to the topic. Keeping in mind the purposes of this current research, the goal here is not to review all of the theories about meaning, but to emphasize its central place in our perceptual life and then its role in human actions or behaviors.

According to Rapoport (1982), the built environment can be perceived to communicate a variety of meanings, from its utility to its symbolism. Because, people react to environments in terms of the meanings the environments have for them. The environment can be understood in terms of shared social and cultural meanings among the members of a physical setting. Socio-cultural meanings associated with a setting bind people to a certain place, which provides a perceived social and cultural landscape of the physical environment. As a result of social

interactions within a particular place, certain meanings are conveyed that include the perception of the functional, motivational and the evaluative meanings of the setting.

Fuhrer (1990) holds that any behavior setting, being used as a cultural entity, which has effects on people, operates via certain denotative and connotative meanings. Denotation is the variance of meaning shared within a group or culture. Thus, denotative meanings represent important contextual determinants of the actions of setting members and impose meaning on settings through the use of cognitive schemes. On the other hand, objects and places are associated with personal or collective experiences, personal or cultural beliefs and evaluations, which can not be expressed by the denotative level of meanings.

Behavior seems to have a common personal and social meaning (Winett, 1991). As a result of social interactions within a particular place, certain meanings are conveyed, including the perception of the functional, motivational, and evaluative meanings of the setting. Meanings associated with certain places are products of social behaviors. The stronger the relationship between an environment and meanings, the more meanings and functions are perceived as place-dependent (Al-Homoud, 1996).

As for the relation to behavior, Francis (1991) also states that use of an outdoor space only may not in itself be enough to make a space successful. Public outdoor spaces can have a larger connectedness for people. For example, there may be a national attachment to Times Square in New York City or a local attachment to a central park in a small town. Some researchers have begun to establish that people do not have to use the space when they do not have any meaning or value for it (Carr et al., 1992). The fact that a space exists as an important symbol or reference may be enough for people to attach meaning to the public outdoor space even though they are not users (Francis, 1991).

When symbols were considered in relationship to an environmental design, the first distinction between the perceptual and associational worlds was made by Gibson. He (1950) proposed a hierarchy of levels of meaning on three different levels: Concrete, activity-oriented and symbolic meaning. For example the ground; it means ground as a concrete meaning; it means path, something to be walked upon as an activity oriented meaning, and finally it means homeland as a symbolic meaning. While the concrete and the use meaning of objects and environments is shared by a wide variety of people, the higher levels of meaning are more personal

and less predictable. In this regard, manipulating high-level meanings is extremely difficult compared to achieving lower-level meanings. According to Gifford (1987), the term meaning refers to three quite different processes:

- **Attachment**, or the profound experience of being part of a place,
- **Communication**, or the way a building or place signifies some philosophical, architectural, social, or political concept to those who view it,
- **Purpose**, appraisals of the place's function in relation to its form or appearance.

Even though researchers explain such a central feature of human existence from different points of views, its role in behavior seems to be revealed with its two different components. In this regard, when we keep in mind the purposes of this study, it requires a detailed examination, especially on the components of attachment and purpose.

### **2.5.1. Place Attachment and Affective Meaning**

Emotion or the term many psychologists prefer "*affect*", is conceptually distinct from evaluation and beauty. The emotional impact of settings deserves separate attention from the description, evaluation, and aesthetics of environments. Emotions strongly influence such key behaviors as the desire to approach or avoid a setting, work performance, and our nonverbal communication in the setting (Gifford, 1987).

The richness of this kind of meaning that a place has for a person grows with familiarity. Place attachment is the process by which many individuals come to assign great personal value to their homes, communities and other settings (Gifford, 1987). Covering a wide range of person-physical setting experiences and relationships, "*personal attachment*" or "*rootedness*" to places emphasizes a sense of belonging lived by the individual (Bonnes and Secchiaroli, 1995).

Attachment is a positive bond between people and their environment, as well as a multi dimensional bond of social interaction. Attachment to place refers to the commitment of individuals to their environment. People basically commit in two ways; with social and psychological involvement. Attachment to place is motivated by social ties, territoriality, physical amenities, needs, preferences, choices, homogeneity, and length of residency. Once people establish attachment to their environment, they feel more secure and will extend their boundaries to include the larger environment settings (Homoud, 1996).

According to Lang (1987), affect mainly deals with emotion and is concerned with like and dislikes. It involves an understanding of values and attitudes. In this respect, affective meaning refers to the emotional aspects of our attitude toward a place, and it is usually measured by having subjects rate affective words in relation to a particular environment like pleasant, exciting, arousing, distressing, unpleasant, gloomy, sleepy and relaxing (Bechtel, 1997).

### **2.5.2. Purpose**

Places may have broad or narrow functional meanings. This kind of meaning refers to our behavioral orientation toward the place (Gifford, 1987). For example, some places are quite behavior-specific; that is, only a few activities are feasible in them, such as a phone booth whereas others are much less behavior-specific and therefore many activities might occur in them, such as a beach.

According to Rapoport (1982), meaning is not something apart from the function but is itself the most important aspect of function. Rapoport (1982) stated that any activity can be analyzed into four components by interpreting them in terms of meaning:

- The activity proper,
- The specific way of doing it,
- Additional, adjacent or associated activities that become part of the activity system,
- The meaning of the activity.

In brief, as being a pragmatic aspect of meaning, the behavioral responses of people indicate how ordinary environments communicate meanings and how they affect behavior.

## **2.6. Physical Features and Perception**

Environmental perception provides the basis for human knowledge about the world. This knowledge is indeed essential to people's ability to function effectively in an urban environment.

According to Abu-Ghazze (1999), environmental perception helps users manage their communication and social interaction with each other, identify important features of their everyday environment and enjoy the aesthetic experiences.

Lofland (1998) created a typology that prompted “*aesthetic pleasures*” from the physical-design features of outdoor spaces. These included:

- **Perceptual innuendo:** Glimpsing an interesting, exotic, or enticing social world that exists outside one’s range of vision,
- **Unexpectedness:** Seeing something unexpected or unfamiliar,
- **Whimsy:** Seeing a fanciful, eccentric, frivolous, or whimsical object or device,
- **Historical layering-Physical juxtaposition:** A jumbling of one type of object or building with another: e.g. historical buildings with contemporary buildings, natural parks with built streets, etc.
- **Crowding-Stimulus Diversity-Spectacle:** A commonplace scene of crowds of people, things and elements that arouse a diversity of stimulus and visual excitement.

These kinds of typologies help designers to understand how people construct and categorize visual stimulus while at the same time they perceive them. The visual character of the built environment, both its formal and associative aspects, as perceived by different people, is different from that of the environment’s affordances for activities (Lang, 1987).

Some empirical work has determined the elements that make up the perception of public outdoor spaces. For example, Im (1983, 1984 and 1987) found factors such as ground slope and vegetation cover as the predictors of open space quality. He proved that perceived visual quality of an enclosed outdoor place in institutional sites, where the visual stimulation is a major source of sensation can be predicted from such ratio variables as height-width ratio, opening ratio, ground slope and vegetation coverage, utilizing a campus environment as a case study setting. Another example searched the relationship between perceived meaning and physical characteristics in the outdoor space enclosed by buildings on university campuses. Findings showed that some of the physical variables highly correlated with users feelings especially about density & scale by using adjective scores (Taniguchi, et al., 1993).

## 2.7. Physical Features and Behavior Patterns

According to Lang (1987), the words “*fit*”, “*afford*”, “*synomorphy*” and “*congruence*” have all been used to describe the relationship between a pattern of behavior and a

pattern of a physical environment. In other words, some milieus afford or fit a specific pattern of behavior better than others; there is a greater degree of synomorphy or congruence between an environment and behavior in one instance more than in another. Many of the discussions about environmental fit assume that a good milieu is one that meets the structure of behavior very tightly.

There are many works which provides empirical data about the assumption that a physical environment elicits an emotional response, which then influences subsequent behaviors. They are concerned with the establishment of functional relationships between the attributes of a physical environment and particular aspects of behavior (see e.g. work of Russel and Mehrabian, 1976).

As for outdoor spaces, the type of activities that may occur in outdoor spaces is obviously contingent with their physical characteristics (Abu-Ghazze, 1999). Gehl (1987) also holds the relationship between physical conditions and activities. Physical environment is a factor that influences the activities to a varying degree and in many different ways. Lang (1987) also asserts the influence of physical elements on activity systems. The liveliness of outdoor spaces depends on what they can afford in terms of comfortable sitting, good light and people-watching and the qualities that generate activities.

When attempting to understand activity in a public outdoor space, we need to think about the spatial distribution of behavior. Spatial distribution of behavior is influenced by both the interaction between users and their activities and the conditions of an environment. The conditions and qualities of the space such as enclosing planes, scenery tend to make certain locations attractive to some occupants and behaviors and less attractive to others (White, 1999).

Alexander (1977) termed "*pattern analysis*" which links specific behavior to specific design features. Even though his approach is quite normative, he tried to make design process much more systematic, with an attempt to link design components to behavior.

According to Kaminsky (1991), Alexander came relatively close to Gibson's "*affordance*" concept with the reasoning in his more elementary patterns. In this regard, "*Pattern Language*" (Alexander et al., 1977) was the first attempt of an architect to systematically link units of behavior to architectural elements, and it is still used by some architects today, especially in USA (Bechtel, 1997). For example, the conceptual tools provided in Pattern Language were used in particular with real



world projects, such as school and university design (Alexander, 1985). Thus, Alexander's work initiated a healing action for difficult tensions between theory and practice, a physical environment and a social environment.

Osmond (1957) introduced the terms "*sociopetal*" and "*sociofugal*" in order to describe the physical features of settings which can provide a "milieu" where encounters and social interactions occur. According to this view, settings have qualities that bring people together and promote their social interaction, that is sociopetal or force them apart with the opposite effect of isolating people, that is sociofugal (Osmond, 1957; Hall, 1966; Brebner, 1982).

Sociopetal layouts are those in which face-to-face contact, particularly eye contact, is easy to maintain. Sociofugal layouts are those in which it is easy to avoid interactions such as back-to-back benches. Each is appropriate in certain contexts. Osmond used these terms to refer to smaller-scale layouts, but they were applied to site-plan layouts later, in which there are public or quasi-public places.

## **2.8. Toward a Synthesis**

Concepts and theories which have been examined up to this point can be benefited to clarify much about the person-environment interface toward obtaining a synthesis. The basic process involved in the interaction between people and their environment is shown in Figure 2.2.

Information about the environment is obtained through perceptual processes. The perception of environmental characteristics affects behavior through information processing. In other words, perceptual processes are followed by emotional responses (affect) and finally actions. Human feelings and actions are limited by the affordances of the natural and built environments.

The perception of a place can involve knowledge about the behaviors that occur there. This implies that knowledge of how one perceives the outdoor public space may help us understand one's choices about where to go and what to do there, since behaviors are likely to be a significant component of space meaning.

In other words, meanings associated with certain places are products of social behaviors. For example, revealing this relation, Abu-Ghazzeh (1999) stated that deciding to go somewhere typically presupposes some idea of what one can do there.

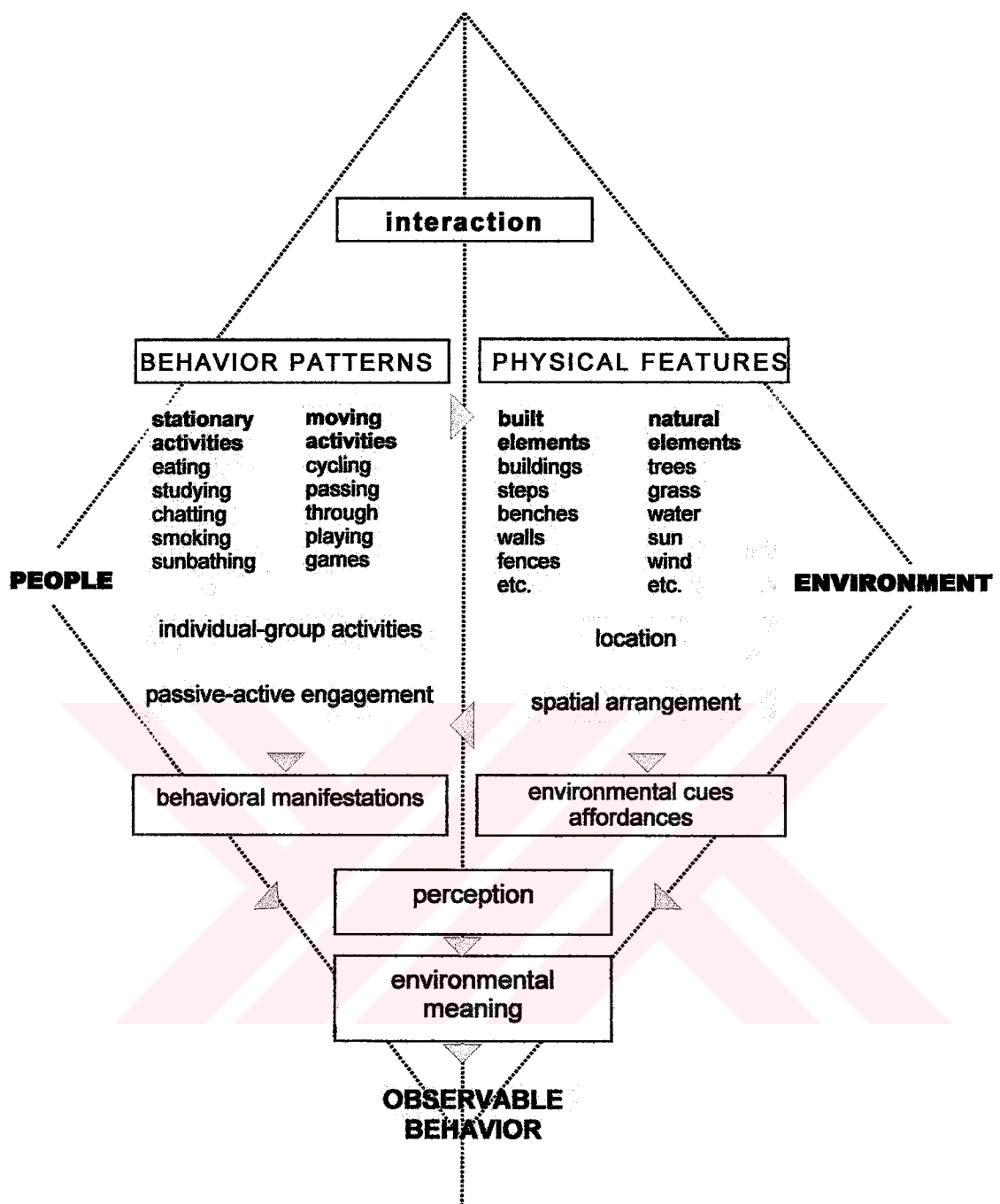


Figure 2.2. A schematic diagram which explains the relationships among the major concepts based on the theoretical perspective of the dissertation.

Overall, this implies that behavior is an important part of the meaning that people attribute to outdoor spaces. The stronger the relationship between the environment and its meanings, the more place-dependent the meanings are perceived to be by the users.

2.9. Public Outdoor Spaces

White (1999) suggests that when thinking about public outdoor spaces, it is necessary to segment the wholeness and unity of space into components. The fragmentation that he uses has three basic components:

- Physical fabric of the space, that is “*container*”,
- The human transactions that happen there, that is “*activity*”,
- The atmosphere of the place, that is “*ambience*”.

The environmental quality of public outdoor spaces consists of two major components that have implications and need to be considered in design issues. The first component is its behavioral and functional quality, which includes the interactions between human behavior and a physical setting. The second component is a physical, aesthetic and visual quality, which expresses visual preference based on a visual sensation (Abu-Ghazzeh, 1999) (Figure 2.3).

In this research, “*public outdoor space*” refers mainly to enclosed public outdoor plazas, as described in the work of William Whyte (1980). One of the essential attributes of public spaces is the quality of betweenness (White, 1999). While there are certainly public spaces inside buildings (churches, city halls, shopping malls, etc.), we are interested here in the exterior ones that occur between buildings such as plazas.

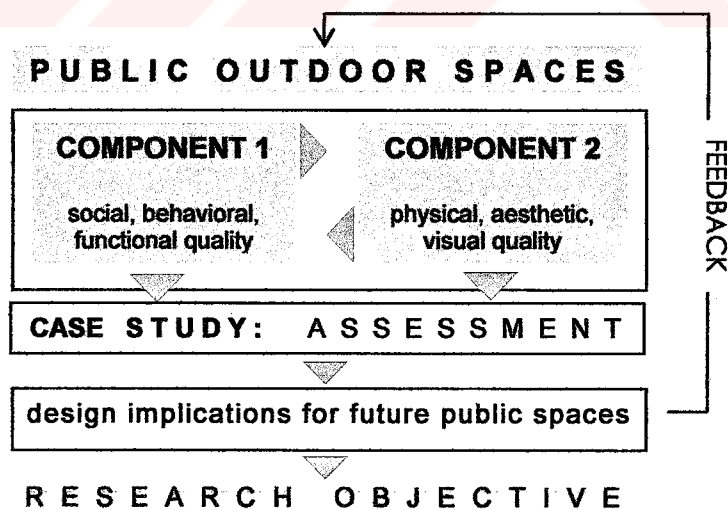


Figure 2.3. Two major components of public outdoor spaces and a sequence towards the research objective.

Public spaces generally must have clear edges, coherent shape with the addition of vertical containment at the perimeter, which has sufficient height and opaqueness to promote a sense of enclosure.

According to White (1999), some of the properties are important to the success of public spaces. Good public spaces must have the attributes mentioned below:

- **Definition:** Good public spaces are well-defined. There is a clarity of boundary, a recognizable shape, perimeter definition and containment, of which an appropriate height, continuity and character.
- **Identity:** Good public spaces possess uniqueness. The space is imaginable, memorable.
- **Character:** Good public spaces have personality, theme, atmosphere, and mood. The space makes a clear proposition about public life and about its role in the network of civic places.
- **Beauty:** Good public spaces move us to an aesthetic experience. The space with all its components is appealing and pleasurable.
- **Habitability:** Good public spaces are activated with functions that attract and sustain urban life day and night.
- **Significance:** Good public spaces are meaningful. There is a reverence for the place because of the events that happen there.
- **Connectedness:** Good public spaces relate well to the broader environment by their location and interaction with immediate neighbors.
- **Sensuality:** Good public spaces engage our senses and emotions. It touches our humanity and invites us to enjoy our feelings and sensations.

Based on recent advances in research and practice, Francis (1991, p.99) defines some essential dimensions of successful urban open spaces as shown in Table 2.1.

Table 2.1. Some dimensions of successful urban open spaces (Francis, 1991).

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"><li>▪ Should be used by a variety of users including children, teens and the elderly</li><li>▪ Should allow for a variety of activities</li><li>▪ People should feel safe and secure when using space</li><li>▪ Space should be comfortable</li><li>▪ Should afford opportunities for user involvement, control and manipulation</li><li>▪ Space should be publicly accessible</li><li>▪ Provides opportunities for environmental learning</li><li>▪ Includes opportunities for discovery, delight and challenge</li><li>▪ Should be ecologically healthy</li><li>▪ Should contribute economic benefits to surrounding community</li><li>▪ Is evaluated, redesigned, and improved over time</li><li>▪ Is democratic</li><li>▪ Is loved by those who use it and live or work nearby</li></ul> |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

The physical characteristics of public outdoor spaces include many elements, such as its spatial and visual characteristics as regard to scale, diversity and hierarchy. They all influence the life of public outdoor spaces in different ways and to different degrees. Their overall influence determines the degree of user-friendliness of the space. The congruence between the physical characteristics of the space and user' behavior is a preliminary requirement of a successful public outdoor space.

### **2.9.1. Potential of Public Outdoors to Generate Activities**

In order to have effectively designed public outdoor spaces, it is essential to understand the role that those places play in people's lives. The physical environment surrounds and supports all human activities. It includes the exterior spaces between buildings where city/ community life is lived. White (1999) uses the term "*urban environment*" as a metaphor by addressing it "*a theater for the drama of human public life*". The exterior spaces reveal "*the public realm*" where community is established and where the experience of belonging, of being a citizen is engendered. As settings for human activity, public spaces provide places for human transactions such as strolling, shopping, sitting, people-watching, seeing and being-seen.

Although the pattern of usage has varied in the course of history, public spaces have always been places for people to meet and greet each other, places to exchange information, places where important events were staged like coronations, processions, feasts and festivals, town meetings and so forth (Gehl & Gemzoe, 2001). Likewise, Carr et al. (1992) described public spaces as following:

"Public spaces are the common ground where people carry out the functional and ritual activities that bind a community, whether in the normal routines of daily life or in periodic festivities" (p.xi).

Tavakolian (1990) carried out some research concerning human communication in open public spaces and its relation to built form. His work illustrates that urban form and place are able to promote direct human interaction by examining two urban squares in Philadelphia. The spatial appeal of these two Squares is primarily an outcome of the positive interaction of physical built form and the social context. The physical form pointed to the important aspects of enclosure, landscape layout, and the physical aspect of location, spatial definition and boundary. However, the primary issue deals with the concept of enclosure and its relation with boundary and perception object in space. Various types of enclosure created differentiated territories. These territories are connected through circulation paths. The work

proved that a physical form's role is much more decisive than a social context by making an inviting and sociable environment. Various types of circulation paths and their configuration with enclosure altogether promote different degrees of social interaction.

One of the most important supporters of outdoor activities is architecture itself, that is, the buildings that surround the outdoor space except for its physical features or layout. Considering the design of both the buildings and outdoor spaces as a unity, Velioğlu (1990) suggested a trilogy, which is, a criterion set to support and evaluate life in public outdoor spaces at the architectural scale, including;

- Organization of movement, implying a contribution to the organization of pedestrian movement,
- Organization of space, implying a contribution to the formation of open spaces in concordance with the existing structure, and
- Organization of use, implying conformity of the building program with the environment, bringing variety to the environment with the program.

At this point, it is essential to examine some issues like the activity types, which were carried out in outdoor spaces and how deeply people engage in those activities.

### **2.9.2. Activities in Public Outdoor Spaces**

As we know, one of the aims of design process is to serve human needs, from basic needs for shelter to complex personal needs for recognition and self-esteem. The concepts of activity patterns-activity systems or use, which make up the essence of livability, have some relationship to the Vitruvian concerns of "*utilitas*". The Vitruvian expression "*utilitas*" is the origin of those concepts, which express activity or use, and one of the basic concerns of environmental designers.

Being a term first introduced by Appleyard (1981), "*use*" or "*livability*" is a dimension or criteria often employed to measure the success of outdoor spaces (Whyte, 1980; Gehl, 1987; Cooper-Marcus, & Francis. 1990). Some researchers state that use is not enough to measure the success of outdoor spaces. Another dimension, that is, how people perceive a space may contribute to use quality of that space.

Researches try to explain the factors which influence people's use of urban outdoor spaces from different perspectives. For example, Whyte (1980) states that use



quality of an open space is a critical ingredient of its success. Some outdoor spaces are dead places. When empty or vandalized, a space simply does not work.

Activity, action or behavior, all of them define what happens in public outdoor spaces, as White (1999) states in the container, better to say as a more general term in space. Who's there? What are they doing? When are they there? How are they using the space? Do the users and use patterns change over time? Is the space safe and comfortable? Is it a pleasure to come to and be in? Does the space attract people and hold interest and presence for a while? All the answers to such questions are indicative of the habitability of a place (White, 1999).

Whyte's work (1980) on urban plazas grew out of a number of case studies using time lapse film to document the use of plazas in midtown Manhattan in the 1970's. It has contributed to many useful design principles such as the importance of providing comfortable "*sittable space*" in outdoor spaces. He emphasizes that sittable space is one of the most prerequisite variables in influencing the use of a public outdoor space; even though he is not sure whether there is a "*cause and effect*" relationship between the two. Carr et al. (1992) also emphasized that comfortable and sufficient seating is an important aspect of nearly all successful outdoor space.

Whyte (1980) argues a wide range of factors that affect the use of outdoor spaces to varying degrees including sun, wind, trees and water, food, the shape of the space, the amount of space, the enclosure, the aesthetic, and accessibility and so forth. Similarly, Friedman et al. (1978) pointed out that generally outdoor spaces have more variable patterns of use than do buildings, emphasizing that amount of sunlight, temperature, wind, and precipitation all influence the use of the out-of-doors. Whyte (1980) also described the best used plazas as "*sociable places*" where you can find more people in groups than individuals, more people meeting people, more couples than singles or exchanging goodbyes. He stated that among all other factors what attracts people most is the existence of other people.

One of the most significant contributions to this field has been made by Gehl (1987), with his work "*Life Between Buildings*". He analyzed outdoor activities in public spaces by dividing them into three categories: necessary activities, optional activities and social activities. He defines necessary activities as those that are more or less compulsory. Optional activities are those that take place only under favorable exterior conditions, when weather and place are inviting. Social activities are all activity types that depend on the presence of others in public spaces.

When thinking about activities in public outdoor spaces, some taxonomy can be useful in recognizing, understanding, and describing the nature of human activity in these spaces. One of the distinctions can be made between stationary and moving behavior. Whereas stationary activities are often wide ranging including sitting, watching, reading, eating, and talking; moving activity means playing games, pedestrian circulation or foot traffic (White, 1999). On the other hand, sitting and standing are the two most popular behavior patterns of public outdoor space users. Activity types such as eating, reading, smoking and chatting, etc. are usually combined with either sitting or standing. The only exception is lying down.

Sanoff (1991) defines activities as physical interactions between a person and an environmental cue, since cues leads to actions. Activities may be easy and smooth or choppy and turbulent by its very nature. They can be mutually supportive or incompatible. Thus, by being combined with the qualities of the architecture of the place, the activity types create a distinct energy, pace, rhythm, speed, vibration in the outdoor places so that the space possess a distinct identity and atmosphere (White,1999).

Public activity in outdoor spaces can be dedicated to one dominant and defining behavior such as children playing or strolling, or may be composed of several balanced activities. Sometimes the behavior profile changes over a day. In some spaces, major public events punctuate the yearly, monthly, weekly or daily activity character and reputation of the place (White, 1999).

Carr et al. (1992) explains two major kinds of engagement as passive and active specific to outdoor activities. These two types have been explained below:

**Passive engagement** is indirect or passive, because it involves looking rather than talking or doing. This category includes the frequently observed interest and enjoyment people derive from watching the passing scene. People-watching or observing others is a frequently reported activity especially in small public outdoor spaces.

**Active engagement** represents a more direct experience with a place and people within it; because some people desire more direct contact with others instead of people-watching. This category provides opportunities to people for socializing with other people.

Carr et al. (1992) also propose three primary values that guide the development of public spaces, which are responsive, democratic and meaningful:

**Responsive spaces** are those that are designed to serve the needs of their users.

**Democratic spaces** protect the rights of user groups.

**Meaningful spaces** are those that allow people to make strong connections between the place, their personal lives, and the larger world.

Cooper-Marcus, C., & Wischemann, T. (1990) also considers that an important measure of the success of public open space is its use, and the use or popularity of a space depends greatly on its location and the details of its design. They also emphasize the linkages between design, location and use.

### **2.9.3. Space Enclosure**

This section will examine one of the most important independent physical variables of this dissertation, namely enclosure. Issues such as what the spatial enclosure is, its importance, how to measure it, will be discussed in this section by using evolutionary theory and literature reviews of previous experimental works.

The space in which objects exist was regarded for many years as having three dimensions; and we also perceive enclosure three dimensionally through the effects of stereoscopic vision. Norberg-Schultz (1971) suggests that space enclosure is the first real attempt from people to possess the environment, and its typical dimensions and form varies from culture to culture.

According to Thibaud (2001), enclosure is possibly one of the most basic experiences of living in a city. It helps us to understand how the built environment conditions, the way people temporarily relate to each other and offers specific views of the urban landscape. Thus, as one of the frames of visibility it involves the delimitation and fragmentation of what can be seen in the built environment. Its function is to structure and direct the visual field of a passerby, to shroud a portion of the place while revealing other parts and unifying what is visible. Enclosure both reveals and hides, depending on the spatial position of the observer. This phenomenon also introduces a differentiation between areas that could be considered "*upstage*" and "*backstage*".

One of the architectural variables that determine the perception of open and enclosed space is the relative size of the space. More specifically, the distance of the space boundary from the observer and the boundary height influence how these enclosures are perceived. The larger the relationship of the height to the distance ( $d/h$ ) the more enclosure is perceived. Therefore, different sized spaces may be

perceived as similar if the relative distance of the space is similar (Hayward and Franklin, 1974). Ashiara (1970) also pointed to the effects of d/h ratio. He explained that when the ratio is 1:1, *"we feel a balance between building height and the space between buildings"*. When the ratio exceeds 1:4 *"the mutual interaction begins to dissipate, and the interaction between buildings is hard to perceive"*. And when the ratio is less than 1, *"the mutual interaction begins to be strengthen and we feel a sense of being closed in that builds up to a kind of claustrophobia"* (p.43).

However, according to Thiel (1986), the relationship between space size and enclosure is not crucial; rather surfaces and boundary definitions are more important for enclosure definitions. These are defined as the space establishing elements (SEE) and include objects, screens, and surfaces occurring in various combinations. Surfaces include front, left, right, over, and under. The absence of all three elements is the least perceived enclosure and the presence of surfaces from all sides of the space is the most perceived enclosure. Side surfaces are intermediate enclosures.

Space enclosure is a function of surface positions. The degree of enclosure is defined by horizontal surfaces (below and above), as well as vertical surfaces (solid and transparent). And the least defined surface is ground (surface is below) (Thiel, 1986).

The degree of enclosure, associated with the presence or absence of a sense of confinement, is postulated as a function of three primary factors:

- The degree of explicitness,
- The absolute volume of the space and,
- The proportions of the space.

However, a sense of confinement depends on more than the degree of explicitness, volume and proportion (Thiel, 1997). According to Al-Homoud (1996), in order to assess external space enclosure, any or all of the variables below, or a combination, must be assessed in terms of both quality and quantity. The variables of external space enclosure include:

- Transitional spaces (entrances, front porches, front steps, front yards, paths and driveways)
- Territorial markers (modification, landscaping, decorating, fencing and signs)
- Architectural surfaces (front facade components including walls, curtains, shutters, openings and overheads and additional external walls and fences).

According to Cullen (1961)'s point of view, enclosure is the most powerful device to instill a sense of position, of identity with the surroundings embodying the idea of hereness, whereas the openness or looking out of enclosure will create a sense of thereness.

#### **2.9.4. Importance of Enclosure**

Enclosure is a fundamental component of physical environments, in which it has many functions. However, the need for enclosure is not easy to explain. It may go back to the human's most primitive instincts of obtaining security and intimacy when they look for a place to sit outdoors (Alexander et al., 1977; Whyte, 1980).

People usually want a public space to have some degree of enclosure, a distinct and definite shape converging inward from the enclosing edges, namely, with a centripetal tendency. Within such a "positive space" (Alexander et al., 1977), people can feel comfortable and organize various activities in a planned, intended way. Whereas those shapeless, centrifugal and "*negative spaces*" are always leftovers, seldom used for public activities.

It is possible to mention about the physiological responses of humans to the effects of enclosure. There is even a specific region in the human brain that responds directly to the perception of enclosure. Those responses actually help us to comprehend the functions of enclosure in physical environments. Stamps (2001) reviews a human's ability to recognize enclosure, and the capabilities of which it brings to urban sites.

First of all, it provides visibility, that is how much and how far one can see. At the same time, this provides *the* dialectic of "*hiding versus revealing*". It also brings the concept of "*mystery*" on the side of "*hiding*" as opposed to the concept of "*spaciousness*" on the side of "*revealing*" in environmental perception. In this regard, features of enclosure indicate where there are regions of safety and danger as well. Its other capacity is to identify and locate objects in physical environments since it obviously describes spaces and easily designates the locations of various objects within the space. Further, it enables either block or permit either visual or physical access.

The quantity (size) and the quality (shape, color, detail) of enclosure affect our psychological reaction to it (French, 1983). These psychological responses like the perception of preferences and safety related to outdoor spaces can be influenced



by enclosure. For example, there are some researches examining the user perception of safety and preference with the spatial arrangement and edge treatment (Jorgensen, Hitchmough and Calvert, 2002). What they found is that open spaces are considered safer than closed ones and naturalistic shrubby edge treatments are considered unsafe relative to less dense treatments.

Another function of enclosure is its effects on the use quality of outdoor spaces. Al-Homoud (1996) examined the role of space enclosure in the front yards of residential buildings and obtained some empirical evidence verifying its effects on the frequency of social interaction. Accordingly, what she found was that space enclosure potentially influences how people interact with each other. In summary, enclosure has very strong effects on environmental perception and environmental preferences as well.

#### **2.9.5. How to Measure Enclosure?**

After describing spatial enclosure and its importance, the subsequent step in this section will be to review the efficient techniques which have been developed to measure the degree of enclosure by different researchers. This part is a literature review of previous experimental work on the methods for measuring enclosure.

**Thiel's Method for the Notation of Enclosed Spaces:** Philip Thiel (1997) developed a system of graphic notation for defining the attributes of physical environments as experienced by users. He stated that his method might be used for analytical descriptions of existing sequentially experienceable environments.

First of all, he treated space in visual terms because of the primacy of vision in human species and stated that visual space exists as a function of UP (User Participant)'s perceptual system. Visual space is "*established*" by the perceived positional relationships of the environmental surfaces. He classified these environmental surfaces as the more tangible substance of the visual world in three basic types: objects, surfaces and screens.

- **Objects** may be thought of as two or three-dimensional forms existing as separate, discrete visual entities in a larger space.
- **Surfaces** are perceived as two-dimensional forms limited in spatial effect to the space they help establish.
- **Screens** are perforated surfaces or spaced objects, and are obviously an intermediate type.



He refers to these Space-Establishing Elements as **SEEs**. SEEs denote the boundaries of the space, determine its areal and volumetric form and extent, and thus indicate the physical possibilities of free movement therein.

To determine if a particular surface, screen or object is in fact an element contributing to the establishment of a particular space, the test suggested by Hall may be employed: hold everything else constant, and vary the element in question. If this changes the nature of the space, the element is then in fact a SEEs.

Attributes of the SEEs:

- Type of SEEs (surfaces, screens, objects)
- Position of the SEEs (over, side, under)
- Number of the SEEs (it is self-evident)
- Size of the SEEs
- Shape of the SEEs (contour, silhouette and relief)
- Direction of the SEEs
- The types of connections between the SEEs (joined, separated, overlapped and continuous)
- Screen solidity of the SEEs.

Attributes of space:

- The degree of explicitness (different scales of explicitness: vague, suggest, volume, valued between 0 and 100)
- Views (in-spaces-out-spaces)
- Space hierarchy (Sub-spaces, primary spaces, secondary spaces and tertiary spaces and so forth)
- Space connections (end, port, merge)
- Spatial form quality (O-type space and X-type space)
- Spatial size, direction and proportion (the main orthogonal dimensions of length, width and height serve to characterize the size of the spaces, and at the same time to convey a sense of proportion and direction).

**HP Notation:** Hemispherical Projection or in short HP is a way to represent the environment as it is visible from a particular location (Figure 2.4.). This spherical geometry can be used basically for the notation of the first-order visual attributes of SEEs such as type, position, number, size, shape and direction. It is especially appropriate for the notation of view attribute. These attributes are described with reference to their appearance in an instantaneous nominal visual field as

represented in the hemispherical projection, at a given point in time and space and with a given body heading.

Along a vertical time line a conveniently sized circle is drawn at each view event: that is, when a view appears, disappears, or any view attribute changes. This circle represents the HP of the nominal visual field. On this the number, position, and the shape of the views at that instant are schematically diagrammed. Objects are shown in solid silhouette, screens are shown in parallel lining, and surfaces are shown in a solid outline. The higher-order SEE attributes of solidity and surface relief are noted by means of alphanumeric coding.

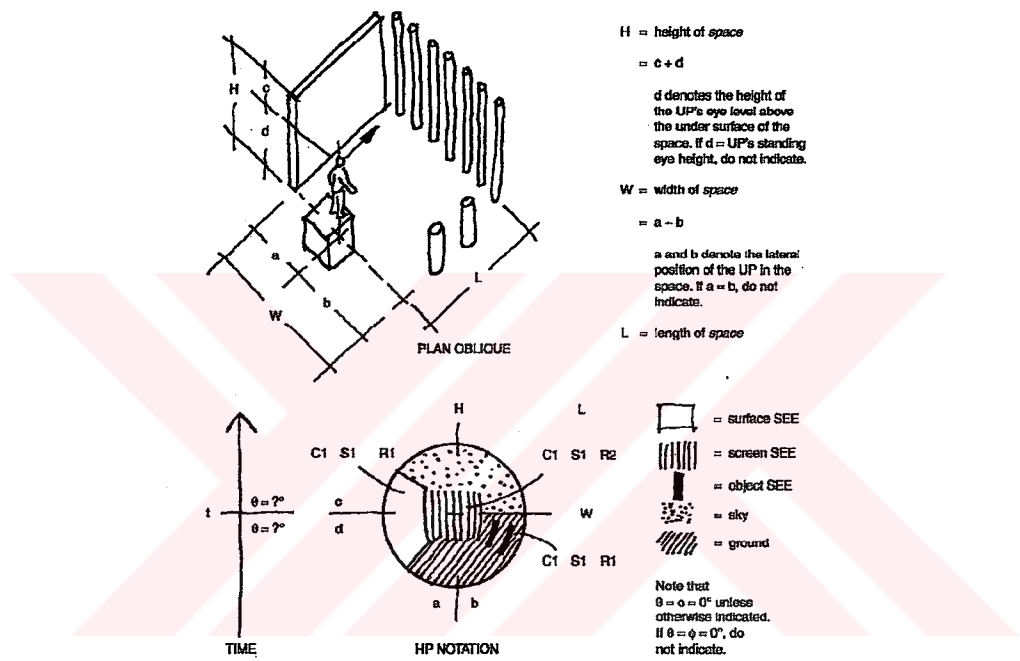


Figure 2.4. Space notation in hemispherical projection (Thiel, 1997).

**SEEP I Notation:** This notation indicates the position of the space-establishing elements, so it is called a Space Establishing Element Position Indicator, or **SEEP I** for short (Figure 2.5.). The LR and ZN axes are used in this simplified notation, and the nominal  $180^\circ$  UP field of view with the same as HP notation. The positions of the SEEs establishing a space at a given instantaneous UP position and line of sight are indicated by the presence of a solid line, a dotted line, or a solid dot (bullet), representing a surface, screen, or object, respectively, positioned relative to these axes.

If the SEEs in the side positions exist only above or below a nominal or default standing UP eye level (assumed to be 5 feet), they are then shown only above or

below the LR axis (which also represent the horizon). Similarly, if the SEEs in the over and under positions and/or the front side positions exist only to the left or right of the longitudinal length axis of the space, they are then shown only on the left or the right of the ZN axis.

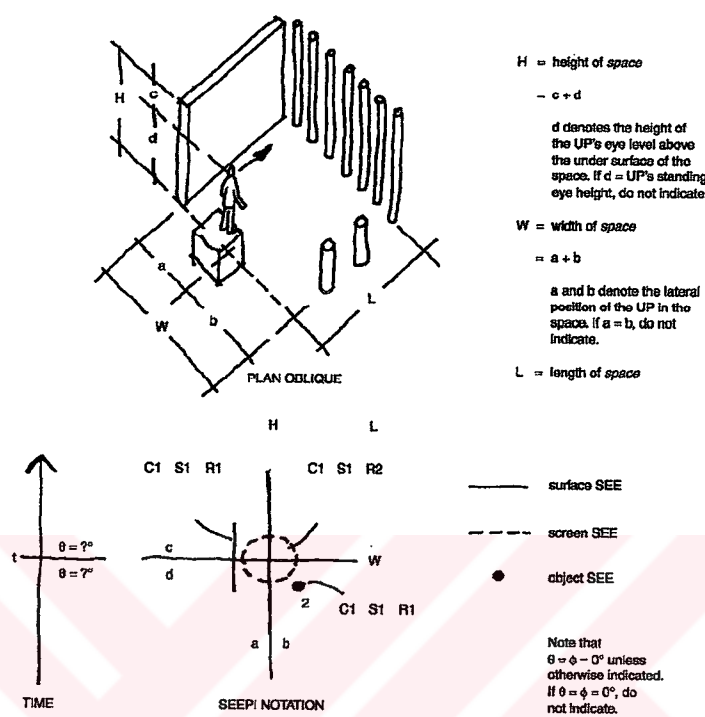


Figure 2.5. Space notation with SEEPs (Thiel,1997).

The HP and SEEPI notations have been developed mainly for indoor spaces by Thiel. However, these notations can also be applied to outdoor spaces. The notation of first-order attributes of the SEEs, which are type, number, position, shape and (relative) size, types of connections are especially appropriate to use for outdoor spaces.

**Mathematical Models:** In current literature, there are some experimental works to evaluate the degree of enclosure on urban sites. For example, Stamps (2001) proposes two mathematical models, that is the station point method and the abstract method for evaluating a strong physical correlate of enclosure in urban sites. The findings of the applications of the two methods by using two data sets covering totally 750 views in 25 urban sites has been compared to test the hypotheses.

In order to parse a view (this means to determine what objects are present in an environment and where they are), it is necessary to divide it into three areas: the

area covered by the ground plane, the area covered by the blocking features, and other areas (typically sky).

The empirical literature already suggests that (a) there is sufficient data to accept blocking features and ground plane as factors influence judgments of enclosure, and (b) increasing the amount of view occupied by blocking features makes the space seem smaller, increasing the amount of ground areas makes the space seem larger.

**The station point method** mimics how views are perceived from many station points within a geographical area. It uses geometry to provide a possible solution for measuring enclosure. Calculating spherical angles of blocking features as they would appear at a point in the region, it resembles to the Thiels's HP notation. The advantage of a spherical representation is that the whole ground surface is represented as compared to camera views, which automatically clip a substantial amount of information. Spherical geometry suggests that the solid angle subtended by an object is directly proportional to the object's height and width and inversely proportional to the square of the distance from the station point to the object.

**The abstract method** tries to obtain estimates of proportions of views occupied by features which block vision or motion from variables which can be calculated from GIS data. The requisite data can be measured from bit maps of sites: (a) total area of the site, (b) amount of the site covered by features, (c) the number of features, and (d) the heights of the features. These four inputs are then converted into two variables: average height of features ( $h$ ) and average distance between features ( $d$ ). Using the equation below, the proportion of blocking features (BLK) can easily be calculated ( $BLK \cong h + d^2$ ).

What Stamps found over the existing empirical literature was that there is a strong correlation between the two methods, that is, the simple abstract model is as accurate as the much more complex station point model.

#### **2.9.6. Transition Zones as Edge Effects**

Space enclosures in the front zone of buildings occur in transitional spaces. Transition is the degree to which there is direct access from a building to a street or any kind of outdoor space, and it facilitates the learning of a new environment (Bell, et al., 1990). In this sense, transition zones are intermediate areas between the

buildings and outdoor urban spaces, both physically and psychologically. To users they are like a bridge between themselves and their community.

Alexander et al.'s (1977) *"A Pattern Language"* included many patterns identify interfaces. He and his colleagues realized that connective interfaces, such as boundaries, physical connections, transition regions and geometrical edges harbor fundamental human activities. In this respect, they are also essential in creating urban coherence. He stated that *"the life of a public square forms naturally around its edge; if the edge fails, then the space never becomes lively"* (Alexander et al., 1977, p.600). Likewise, Gehl (1987) emphasized that if the edge of a public space works, so does the space.

Over the twentieth-century buildings generally lost their inside-outside connection. Glass walls, which were used widespread over this period emphatically, do not couple indoors with outdoors; they create informational ambiguity by connecting visually while disconnecting physically and aurally (Salingaros, 2000).

Salingaros (2000) suggests coupling at a building's edge as a way which almost always works via an intermediate region. Without any interface, the indoor-outdoor transition is abrupt, and the connection is lost. For example, the principle behind the half-covered veranda is to give a feeling of enclosure, while at the same time opening up to the outside world in front of the house. On the contrary, even though it is a very recent notion, a green area surrounding a building does not make a connection because a flat lawn provides no boundary. As Alexander (1977) stated, most successful green areas are surrounded by something- a building, a wall or a river.

Salingaros's (2000) other examples as couplings are; an entrance hall linking the street to the house interior; a roofed corridor as a transition between the inside of a house and a patio or garden; an arcade as a transition between shop fronts and a street or plaza; or a covered patio as a transition between the inside and the exposed space outside. He takes edges and interfaces as complex, fractal lines that make up a living city. Thus, a city is made up of interactive edges, along which much of the human interaction that makes a city *"alive"* actually takes place.

Gehl (1987) examined the transition zones in residential buildings by looking into how the conditions of the areas on the public side of buildings, which have a direct connection to the outdoors, influence the character of life between buildings. He proposed some design principles to be able to support outdoor stationary activities

at the residential level and stated that they are applicable to a great number of other building types as well. These principles include;

- To provide easy access in and out.
- To create suitable places for outdoor stays such as good resting areas directly in front of the building, places to sit at the entrance door and a semi-private front yard in the transitional zone.

Physical elements and some details such as a porch, a front yard, a small terrace, a tiny garden, front steps, a bench by the door, a niche by the entrance, fences will create a carefully designed edge zone. In contrast to this approach, if there is poor detailing and weak indoor-outdoor connections, only coming and going activities, which are very brief in duration take place, this greatly reduces the use of outdoor space. So there must be a flow of life between public and private spaces. This can be achieved only if the indoors and outdoors are able to be linked both functionally and psychologically (Gehl, 1987).

Some researchers have shown that when people stay in outdoor spaces, they universally tend to sit on the edges of spaces or near the facade of the buildings adjacent to the outdoor space, rather than in the middle of them (Marcus, Francis, 1990; Alexander, et al., 1977; Gehl, 1987; Hall, 1969; Li, 1997). French (1983) also states that we feel comfortable only on the edges, or near areas which offer some psychological protection like a fountain, sculpture, and umbrella. This phenomenon has been called the “edge effect” by Jonge (1967/68). A straight edge accommodates fewer uses than does an edge, which has many “ins and outs”.

Table 2.2. Functions and typology of transitions zones.

| TRANSITION / INTERMEDIATE / INTERFACE ZONES                                                                                                                                                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                               |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| functions...                                                                                                                                                                                                                                                                                                                                                                  | typology...                                                                                                                                                                                                                                                                                                                                                   |
| <ul style="list-style-type: none"> <li>. views to and from indoors and outdoors</li> <li>. easy and direct access</li> <li>. protection from the weather</li> <li>. comfortable seating</li> <li>. sense of enclosure</li> <li>. human scale</li> <li>. perception of safety</li> <li>. affords social interaction</li> <li>. balance between public &amp; private</li> </ul> | <ul style="list-style-type: none"> <li>. solid-glass walls with windows and doors</li> <li>. front porches-verandas</li> <li>. arcades</li> <li>. decks or terraces</li> <li>. covering structures</li> <li>. alcoves</li> <li>. level changes/ steps, stairs</li> <li>. an entrance hall-a roofed corridor</li> <li>. changes in pavement... etc.</li> </ul> |

Transitional spaces also represent a hierarchy from the public to most private. In the interface of the built form and outdoor space, the transitional zone at the boundary serves for the linkage and the separation of private and public realms. The entrance portal of an office building, the arcade of a shopping mall, the steps in



front of a convention center or the lobby of a public building are examples of transitional areas, indicating a progression from public street to semipublic interior (Özyörük, 1995).

According to Bentley et al. (1993), the interrelationship of public and private domain depends on the permeability of the environment. Permeability, across the public-private interface is largely a visual concern. A physical permeability should be provided at the interface, especially at the entrances of buildings. This enriches public space by increasing the level of activity around the edges.

Transition areas are also good settings for social contact. For example, Brown, Burton et al. (1998) examined front porches considering them good settings for social interaction with family members and neighbors. The front porch has been described as *"an important point of contact between the public life of the street and the private dwelling"* or a mediator *"between public and private realm"*. Served as outdoor continuations of small interiors, front porches were mainly used for resting and relaxing, casual conversation, watching neighbors and passers by and reading.

## **2.10. A Brief Review on Campus Environments**

This section is a brief review on campus outdoor spaces as settings for a wide range of student activities. Campus environments will be reviewed here with their qualities, which are only related to their use or livability.

"The efficiency of a campus plan is not merely to provide the physical setting in which the formal activities of the university are to take place. Much of the education of anybody occurs outside and separate from the formal courses in which he is registered, and only if the plan has the kinds of qualities which will stimulate curiosity, prompt casual encounters and conversation...will the atmosphere which it produces be truly educational in the broadest sense".

As Keast (1967) quoted from Cooper-Marcus & Francis (1990, p.143) above, they must be rich not only in environmental conditions, but also behavioral-functional qualities.

### **2.10.1. Campus Outdoor Spaces**

Throughout history, campus plans have showed considerable changes till today from the American Campus Model as an *"academical village"* to the traditional English Model, which uses the quadrangle or courtyard; but whatever the model is,

it was not only the design of individual buildings, but a creation of a whole community. Le Corbusier interpreted this quality of campuses, after traveling to America, by saying *"a campus is an urban unit in itself, a small or large city, but a green city"* (Turner, 1984). Accordingly, like a city, the inner structural changes on their physical forms should be designed to the principles and theories of *"urban design"* (Kortan, 1981).

Campus environments can be located in urban or non-urban contexts. Over the history, many famous campuses were built as inner city campuses. Fast urbanization process in the beginning of 20<sup>th</sup> century, and especially after 1960's, caused campus environments to be built outside of cities. Both campus types have some advantages and disadvantages. While the inner city campuses benefit from the opportunities of mutual interaction with the city, campuses outside of cities have a more flexible pattern and a fast growing capacity (Erkman, 1990). It is expected that these two major campus types also have differences in outdoor space use.

A successful campus must be an exemplifying innovator in any city's urban development with its indoor and outdoor spatial designs. In this regard, responding to the needs of people who live in the city, campus outdoor spaces play an important role in the integration of a campus environment with the city it is located in (Birkan, 2002).

As Keast (1979) claims in the quote at the beginning of this section, one of the most meaningful and important elements of any campus environment are those spaces not formally tied to academic or administrative activities, but places in which one can derive both social and aesthetic pleasures. Outdoor spaces create a unified overall pattern in a campus environment, while they can offer places to be in by inviting strolling, sitting-resting, chatting, studying, people-watching, and seeing-being seen and so forth. They can also add quality to a campus environment by conveying a sense of place, purpose and order.

Outdoor spaces have always been an essential element of campus design and, indeed, a crucial area of concern. Basically, outdoor space design should be considered as an integral part in order to unify the design of the campus.

Ideally, a campus should basically convey a sense of order, place, purpose and quality. An attractive, engaging campus surrounding must be conducive to both a wide range of student activities and tranquility and at the same time maintain this harmonious atmosphere. In order to achieve these goals, an organizing element

that draws campus together is needed. At this point, outdoor spaces can be considered as the unifying elements of campuses that bind architecture and landscaping (Griffith, 1994).

Adding quality to campus environments architecturally, visually and functionally depends on designing outdoor spaces between buildings accurately and successfully. Campus outdoor spaces should be designed according to the users' functional and psychological needs (Önal, 1999).

Outdoor spaces not only serve functional needs, but also involve social, spiritual and aesthetic considerations. They help to add quality to a campus environment and constitute a valuable resource by establishing a venerable campus identity and creating a strong sense of community (Griffith, 1994).

Buildings and outdoor spaces are experienced as people move through them. Creating sequential outdoor spaces and binding disparate buildings or parts through them give a visual uniqueness to a campus, and then create a unified overall pattern in itself. Thus, people will have a strong sense of where they're going, and feel confident that their needs will be met along the way (Griffith, 1994).

There is an awareness that is growing day by day about the role of outdoor spaces' on campus environments. In this regard, it is possible to illustrate some examples of campus development projects searching for a way to integrate the campus into a coherent whole by means of mainly outdoor spaces. For instance, North Carolina State University (NCSU) benefited from the development of the exterior environment for this purpose using concepts like *"campus neighborhoods"*, *"campus paths"*, *"shared open spaces"* and *"heart"*.

Campus neighborhoods may have distinct characters, but all contain a mix of uses, have a sense of self-contained place, and are focused around a shared space. Campus neighborhood buildings are clustered so as to define five distinct types of shared open spaces: Campus greens, courtyards and plazas, campus streets and natural areas. Shared open space describes the important public places between buildings, places in which numerous activities occur central to the life of the university and heart describes the natural gathering places that people are drawn to on campus. Emphasizing the campus is pedestrian oriented for the most part; campus paths are any transportation route, from a footpath to a major transit route.

There can be a variety of techniques in order to connect different spaces on campus environments as paths. It is possible to see one example of these campus

paths in Figure 2.6. As a pedestrian bridge, it is in visual harmony with the surrounding buildings in addition to the function of connecting (NCSU Master Plan Report, 2000).

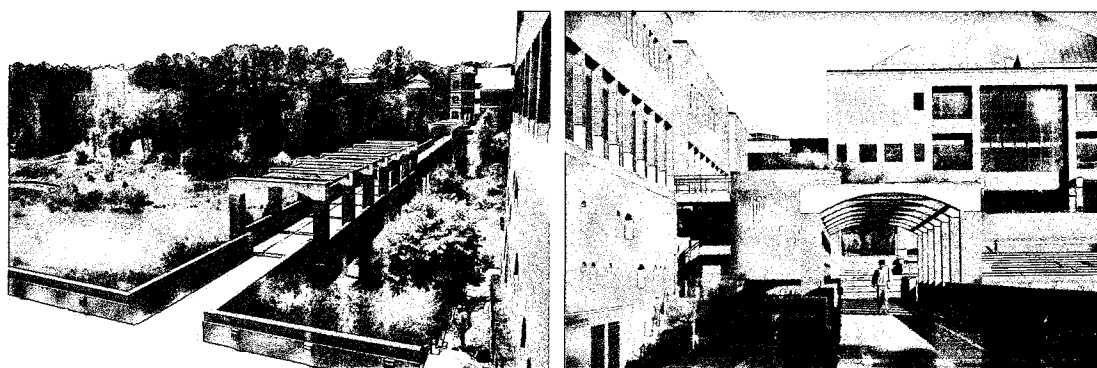


Figure 2.6. An example of a campus path, a pedestrian bridge from the Centennial Campus of North Carolina State University which provides pedestrian flow and connects different campus parts.

Another example is from Europe-Berlin Technical University. TU organized an international summer school activity in order to discuss how to integrate campus areas to the city of Berlin in 2002. It was an attempt to socially and physically integrate a fairly large institution into the existing urban milieu. Emphasis was on outdoor spaces in all of the solutions along with some proposals for existing campus buildings, renovated in such a way that they can afford outdoor life (Aksoy & Yildiz, 2003) (Masterplan Booklet, 2004).

Public outdoor spaces on a campus might be streets, pedestrian pathways, courtyards and public plazas. Their characters are strongly dependent on the character of the buildings or the land-use around them (most often both) as well as the design of these outdoor spaces. Figure 2.7 represents the character of a courtyard campus outdoor space, which mainly depends on both the surrounding building and the design of the space itself.

Marcus & Wischemann (1987) say that a campus should allow the basics of behavior and comforts of users in designing the spaces between buildings. The campus area must be treated, as far as possible, as an extension of the existing life and character of the area rather than a separate precinct.

A high-density, mixed use campus environment creates a sense of place and identity, encouraging a concentration on activities. Outdoor places where social learning occurs must be enriched with benches, wide staircases, greenery and so forth. A campus environment must let the social life of the outdoors predominate.



Principles like modularity, mobility, flexibility, fluidity and the connectivity of elements must be applied in designing campus outdoors.



Figure 2.7. The courtyard of Taşkılla, a visually pleasing campus outdoor space that is rich in both soft and hard landscape elements and surrounded by a historical building as well.

The physical elements in outdoor spaces include green lawn space, as well as trees, benches, plants, water, lighting, paving, kiosks, drinking fountains, walkways, bikeways, sculptures, staircases, etc. Figure 2.8 illustrates one of these elements, a sculpture on campus pedestrian path as an eye-catching figure.



Figure 2.8. An eye-catching figure-sculpture placed on a pedestrian pathway at Berlin Technical University Campus.

Campus outdoor spaces have been frequently ignored in books, yet their uses for circulation, study, relaxation, and aesthetic pleasure, deserve far greater attention than they have received. Researchers indicate that a good deal of life and learning also occur in spaces between specific buildings on campus. Casual interchange, chance meetings, entertainment and study between classes take place outdoors when the weather permits (Marcus & Wischemann, 1987). Figure 2.9 illustrates these activities that occur in outdoor spaces.

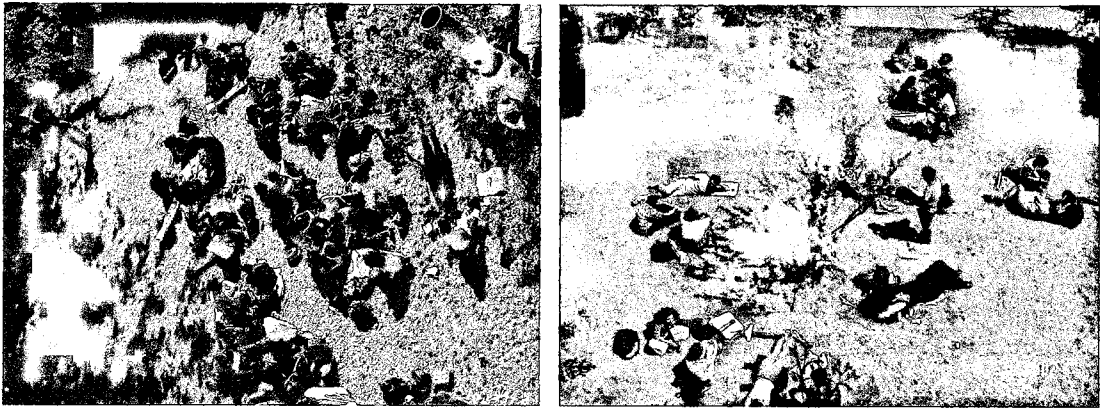


Figure 2.9. Heavy use of a courtyard space in Taşkılla Campus at Istanbul Technical University; various student activities in groups reveal different use patterns.

Mahadin (1987) points out the adaptive use of campus outdoor spaces. Adaptive use should emphasize the significance of outdoor spaces in how they are arranged in a relationship to a new or old development and in relation to activities within these spaces. It can be a significant force in restoring community confidence in the social as well as economic value and future of neighborhoods, districts, campuses and indeed the campus community as a whole.

A great campus is not the buildings, which often are essentially boxes, but the way they are arranged in visually pleasing groups that have a human scale. People must be able to ramble naturally, without being blocked by fast-moving traffic, parked cars, or oddly placed buildings. Only in this way, campus environments can be conducive to interaction and contemplation (Marcus, 2001).

In sum, campus designers should consider basics of behavior and comfort in designing the spaces between buildings. A wide range of student activities on a campus must be the major topic in this manner.

### 2.10.2. Current Research on Campus Outdoor Spaces

It is possible to find some case study examples in published literature on how campus outdoor spaces were used. The most important ones of those accumulated works up to now include, for instance, the University of New Mexico Campus (Rohane, 1982), the University of Wisconsin-Milwaukee (Ahrentzen, 1999), the University of Jordan (Abu-Ghazzeh, 1999), and the University of California at Berkeley, Department of Landscape Architecture (Cooper Marcus and Wischemann, 1983).



The work on the University of New Mexico Campus is an evaluation of outdoor space use utilizing a campus use survey. The aim was obviously to make recommendations concerning the future development of outdoor campus environment and hence improve the quality of campus outdoors.

The other work on the University of Wisconsin-Milwaukee is again an assessment of public spaces of the whole campus with some design recommendations, which were organized in four phases as follows; design review and inventory, tracking people in places, viewpoints and visions and lastly generating design ideas (Ahrentzen, 1999).

Another study was conducted by Abu-Ghazze (1999). He drew conclusions on campus outdoor spaces on the basis of the case study at the University of Jordan. These include the following:

- Campus outdoor spaces should not be treated as leftover spaces,
- Campus outdoor spaces are focal points of student's everyday behavior,
- Campus outdoor spaces are responsible for unifying the campus area into a cohesive whole,
- In addition to being a place of learning, the campus should provide an environment that aids people to meet other people and engage in social interaction.

One of the most significant studies about campus outdoor spaces was performed by Cooper-Marcus and Wischemann (1990). They studied the design of outdoor spaces on a number of campuses in the United States and made observations about how people use such spaces. They introduced some important design concepts such as *"the front porch, the front and back yard, the backdoor, campus entrances, major plaza spaces"* concerning campus outdoor spaces. They also established guidelines for the design of campus outdoor spaces by employing the Post Occupancy Evaluation (POE) as the method. These guidelines deal principally with the design of outdoor spaces as areas to be in, rather than just to pass through.

Deasy and Laswell (1974 & 1985) carried out a detailed study on the Long Beach State University Campus. What they noted was mainly that the main entries to buildings had the greatest concentration of outdoor campus use. In their interviews with students, they found that the entry spaces should include study spaces, eating spaces, and spaces for casual seating.

In recent years, Dober (1992, 1996, and 2000) has drawn attention to the practice of campus design. His 1992 book, *"Campus Design"*, concentrated on the importance of place making. A subsequent volume, *"Campus Architecture: Building in the Groves of Academe"* (1996), focused on the role of buildings in shaping the campus.

In his recent book, titled *"Campus Landscape"* (2000), he described a comprehensive tool for the practitioner of campus planning and design. His intention was to point out the interplay among the various campus components and determinants he has developed. The first group, which he calls *"Design Taxonomy Components"*, includes both campus objects such as walks, signs, lights, furniture and functional types such as heritage spaces, secondary spaces, arboreta and the like. The second group, which Dober calls the *"Campus Landscape Design Determinants"*, includes climate, topography, vegetation, visual character, and more, as the factors that influence the shaping of the components into a campus. Physical elements make it possible to have a distinctive character for the campus only as a result of this interaction.

## **2.11. Conclusion**

This chapter examined a number of theoretical issues, which are related to the objective of this research like the perspective of ecological psychology, behavior settings theory, environmental cues and meaning, affordances, public outdoor spaces, enclosure and campus environments.

In the ecological psychology, the emphasis is more on environmental variables, not on personal-subjective variables. According to Barker's ecological psychology, knowing about the physical setting tells us much about the behaviors that occur there. When trying to determine what kinds of behavior are connected with particular design features, ecological psychology presents the methods that are most appropriate. As noted earlier, these methods help us to comprehend how people respond to the settings they occupy. This is the other way of saying, they help to determine what behavior a specific design feature encourages or inhibits.

Based on the ecological perspective, behavior setting theory is a systematic conceptualization of *"natural life units"* or a systemic happening complex. The history of behavior-setting theory is over a half-century old. Since 1947, conceptual developments showed that behavior setting theory has an evolutionary process.

From the first conception of Barker & Wright up to this point, it has changed and grown considerably. Right now, it is possible to mention that behavior settings are flexible, adoptable and dynamic; they are not as stricter and static as their concept first emerged; and its development seems to continue.

Affordances are opportunities for behavior in the environment. In this regard, the major difference between affordances and environmental cues is that affordances are much more oriented to the functional qualities of settings. After examining the eco-behavioral approach and affordances, it was discovered that these two theories can be benefited from as the basis of the theoretical perspective of this dissertation due to their complementary and integrated qualities. Especially, it is inevitable to use the theory of affordances because of conceiving public outdoor spaces as BSs. Only in this way, that is, by using these theories in an integrated way, it is possible to comprehend activities in public outdoor spaces, and see how and what they depend on.

It has been shown that behavior patterns and milieus are interlocking entities. Behavior patterns in public outdoor spaces results from the relationships among environmental cues, perception, meaning, and physical attributes of the environments. From this point of view, public outdoor spaces in general, campus outdoor spaces in particular can be studied as behavior settings.

The binding role of outdoor spaces in campus design was emphasized; as settings for a wide range of activities, their potential for outdoor life was revealed; and finally current researches were summarized as a preparation stage for the case study.

Examining all these theories and concepts revealed some important factors for the use of outdoor spaces. Below, there is a list of key factors, which affect use variables in public outdoor spaces as the outcomes of literature review:

- sun, wind...(climatic, weather conditions)
- the shape of space
- the amount of space (size of space)
- the amount of sittable space
- degree of enclosure
- the easy accessibility of the space
- being visually pleasing (aesthetic)
- transition zones between indoor and outdoor
- entrances and easy access between in and out

- the activities created in the space itself
- activity diversity of buildings on ground floors
- landscape elements

Overall, this chapter summarized the significant theories and research results, which are crucial to the objectives of the current study; and thus extracted some important concepts regarding to the use value of outdoors.



### **3. RESEARCH DESIGN**

"Design is difficult to describe because it includes so many intangible elements such as intuition, imagination, and creativity- which are essential to research as well".

(Zeisel, 1981,  
p.3)

"A research design is the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of a study. Every empirical study has an implicit, if not explicit research design".

(Yin, 1988, p.27)

#### **3.1. Introduction**

This chapter aims to introduce the method which was utilized in this research, and to explain why this method was chosen for this study. It firstly states the research questions and hypotheses and then clarifies the research strategy and methodology developed to conduct the study. Secondly, it defines the explanatory concepts and the dependent-independent variables of the current study. After outlining the design of research, it enlightens the proposed model to determine and evaluate livability or use value of enclosed outdoor spaces.

#### **3.2. Research Questions**

This research started with a general purpose to study how people used enclosed public outdoor spaces. Through the pilot study, which was conducted at the Centennial Campus of North Carolina State University, the aims of this research became clearer and more specific. Reviewing and analyzing the available literature also helped to refine them.

After making a synthesis based on both theoretical issues and the results of earlier empirical research, research questions were developed into the ones which are explained below. However, some earlier experience and observations of the researcher about how people use our surrounding outdoors throughout daily life, partly directed and influenced this process. In this research, the following main and sub-questions were posed:

1. What are the factors which influence the use value of enclosed outdoor spaces?
  - 1.1. What factors were the most significant in predicting the use value of an enclosed outdoor space? Namely, what is the order of importance of those factors which affect the use value of enclosed outdoor spaces?
  - 1.2. Can these factors establish a model to evaluate use value of enclosed outdoor spaces?
  - 1.3. Are there any gender differences between behavior patterns?
2. How influential can physical features be on users' behavior? In other words, to what extent may physical features have an influence on outdoor space use patterns?
  - 2.1. Do certain distinct attributes of the outdoor environment respond to some certain behaviors-use patterns?
  - 2.2. What physical attributes are chiefly the most influential on the behavior patterns, which were occurred in enclosed outdoor settings?
3. Does enclosure affect the way people use outdoor spaces? Namely, what does enclosure tell users?
  - 3.1. What specific activities relate to the edge of the space? In other words, what kind of activities does enclosure indirectly lead to as a visual cue?
  - 3.2. Does the way the boundaries between indoor and outdoors are treated affect the use of enclosed outdoor spaces?

### **3.3. Research Hypotheses**

Research hypotheses were formulated and constructed including the major and minor ones as follows:

#### **3.3.1. Major Hypotheses**

The major hypothesis of this study is that there are many factors which influence the use value of enclosed outdoor spaces. Many factors, which can be physical, social-cultural and climatic, are influential on the use value of enclosed outdoor spaces. Thus, the overall use of an enclosed outdoor space is the result of a comprehensive integration of all these related factors-elements. These factors, every one of which has an effect on the use value to varying degrees, together may establish a model to evaluate use value in enclosed outdoor spaces.

The second major hypothesis is that the diversity, frequency and duration of activities, which are the components of use value, would be a function of physical



and architectural features, since they provide cues for actions. This is another way of saying the type, frequency and duration of activities that may occur in settings can be contingent with their physical characteristics. On the other hand, all of the physical attributes are not probably influential at the same degree on the use value components. Some physical features may carry behavior generating attributes much more than some other physical features.

### **3.3.2. Minor Hypotheses**

Being surrounded by buildings offers a potential user group, which are users of those buildings, to adjacent outdoor spaces. Depending upon the edge effect, buildings create an influence area around themselves, in which both use density and patterns tend to differentiate in comparison with the areas which are away from them.

In this respect, the minor hypothesis of this study is that the degree of enclosure of outdoor spaces may affect the way people use them. Because, space enclosure potentially influences how people interact with each other. Thus, it may have a positive relationship between the degree of enclosure and the livability of outdoor spaces.

In other words, where the degree of enclosure was felt by users, people were likely to use that kind of outdoors very frequently. The concept of enclosure, on the other hand, includes many other physical variables in itself; like transition spaces, landscape elements, architectural surfaces and the degree of enclosure. In this regard, the way the boundaries between indoor and outdoor are treated may also affect the livability of outdoor spaces.

### **3.4. Research Strategy and Methodology**

As it was mentioned earlier in the hypotheses, there may be many factors which influence the use of enclosed outdoor spaces to varying degrees, and the overall use of an enclosed outdoor space is the result of a comprehensive integration of all these related elements. In this regard, in order to study such a complicated topic involving many factors or components, any single method seems to be limited and insufficient.

To be able to overcome any single method's weakness and limitation, a multi-technical method was developed as a strategy by deliberately combining different

types of techniques in the same investigation. Therefore, this study inevitably employed a multi-technical method that includes:

- 1. Descriptive analysis:** The use of photographs and field notes to record the physical features of the campus outdoor spaces that can be related to use variables,
- 2. Field Observations:** Conducting direct and systematic observations of people for behavioral mapping,
- 3. Questionnaires:** Face to face questionnaires to obtain data about the relations between presumed factors and the components of use value.

#### **3.4.1. Descriptive Analysis**

The selected settings were examined under different physical sub-settings and further classified into physical elements in order to make it easier to discuss place specific information of observations and the questionnaires' results. In other words, describing sub-settings enabled the identification of the location of the various behaviors.

Settings were analyzed descriptively by utilizing photographs and field notes in terms of location, context, user identification, spatial and physical attributes, successful and unsuccessful features, façades, transition spaces, entrances-front yards, focal points-sculptures, aerial views and silhouettes.

#### **3.4.2. Field Observations**

Observation, which is watching people behave and recording what is seen, was carried out for behavioral mapping. It has one significant advantage that needs to be emphasized. Observation is a much more direct technique since it does not measure what people say they do like questionnaires. It simply measures what people do in settings.

Developed by Ittelson, Rivlin and Prohansky (1970), behavioral mapping, in this respect, is a structured observational technique in which behaviors are observed, recorded and located on a map of the setting being observed. It is used to find out who is doing what at which location, since it shows the location of people in the setting, and thus provides place-specific information. In this technique, the behavior observed is recorded in three primary dimensions; *“activity types”*, *“locations of activities”* and *“gender of users”*.

A researcher should also have extensive familiarity with the settings and the daily experience of people. For this reason, the site was visited and observed before starting the case study procedure. This earlier visit to the case study settings also allowed the researcher to determine these settings' peak use time interval over a weekday.

The observations were systematically made over a two-week period in the May of 2003. Thus, by this way, the outdoor campus spaces were checked over five weekdays at ten minute intervals beginning at 12.10 a.m. and extending to 1.10 p.m. This time period was selected because during the initial observations it was determined that the most frequent use time was during the lunch hours. At the end of this process, notes from repeated observations of the outdoor campus space were synchronized to provide a single account. Thus, the behavioral map represents the total composite, which combines all data recorded throughout the total period of the study.

#### **3.4.3. Questionnaires**

The questionnaire is an important technique to obtain data in this field, whose success much more depends upon how carefully questions are constructed and how clearly stated.

Question formats included both structured and open-ended questions, bi-polar adjective scales, and satisfaction ratings for specific physical elements. The questionnaire was designed to collect information about nine major independent variables and four dependent variables (see Appendixes A, B, C and D). Specifically, it was concerned with the different use patterns, user's perceptions and preferences about outdoor spaces of the campus to address the issue of: What activities do people prefer to do, where and why?

The first section of the questionnaire included questions that asked about the major dependent variable, *"use value"*. Respondents were asked to specify the activity types that they engaged in in the case study settings and the frequency of each activity per week. They were also asked to mention the specific place in the setting that they preferred for each activity and the reasons for this preference. In addition, they were also questioned about the occupancy time, that is, how long per week they totally used this setting. This section was divided into two subsections, one for *"individual use"* and one for *"group use"*. The rest of the sections were designed to measure the nine independent variables as following:

1. **Physical features** were measured in terms of the satisfaction degree of people relating to both built and landscape elements of the setting, like water fountains, greenery-trees and lawns, sculptures, steps, pedestrian pathways, ledges, benches, pavements etc.
2. **Enclosure** included perceived enclosure degree, activity diversity of the surrounding buildings, interface/ transition spaces, and easy access between indoors and outdoors, continuity of indoor activities to outdoors.
3. **Aesthetic and visual qualities** were measured with questions about how users perceive the setting through the adjective pairs.
4. **Context** was measured in terms of location and accessibility of the setting.
5. **Spatial layout** was measured in terms of the perceived shape, size, and spatial layout of the setting.
6. **Planned activities** were measured using information relating to what planned activities took place in this setting, whether users participated in those activities or not, and what activities they participated in.
7. **Pedestrian movement** was measured via frequency of movement through the setting and whether users liked or disliked watching the pedestrian flow.
8. **Period of time** was measured when people are using the space most often, in terms of seasonality, day of week and time of the day.
9. **User profile** was measured with questions concerning the demographic qualities of the users like gender and age, the semester that they attended, the total residency duration on campus and their attitudes/habits about using outdoors.

While assessing aesthetic-visual attributes of the settings, respondents were asked to evaluate each setting by utilizing six pairs of semantic differentials on a five-point Likert scale, such as attractive-unattractive, inviting-repelling, comfortable-uncomfortable, beautiful-ugly, relaxed-tense and ordinary-unique in the part of E in the questionnaire. The semantic differential is a good instrument for exploring the connotative meanings of things. Connotation here refers to the personal meaning of something, as distinct from its physical characteristics.

#### **3.4.4. Participants-Sample Characteristics**

A total of n=209 respondents participated in the questionnaires during the May of 2003. Of the 209 people who participated in this study, 101 was female, which is about one half of the total respondents, 108 was male, which is the other half of

total respondents. All of the respondents were students who were between the ages of 18-32.

Utilizing a selection of three settings on the whole campus with different physical features and layouts, a respondent group of seventy students for each setting, that is, total respondent group of 209 students, were asked to participate in this study by means of answering a face-to face questionnaire. Participation was voluntary. Respondents who were engaging in any kind of activity in the outdoor space were selected randomly.

### **3.5. Constructing Validity and Reliability**

The validity of an environmental assessment refers to how correct it is. They must be reliable before they can be valid. A method is reliable if it yields consistent assessments (Gifford, 1987). This study has benefited from the two different ways of constructing validity and reliability.

As a sound approach, the first one is to use multiple sources of evidence; in other words, to use different techniques to acquire the same information. As a matter of fact, using multiple sources of evidence is a crucial part of increasing validity during the data collection process. The independent sources of data and the agreement of them can guarantee validity. For example, obtaining the same data from different techniques, like using both questionnaires and observations about the same phenomenon, will enable the researcher to cross-check the accuracy of data. Indeed, validity and reliability must be contained within the data collection process itself. As Yin (1988) stated, a major strength of case study data collection is the opportunity to use many different sources of evidence.

The convergent findings of a multi-technical approach may be acceptable with far greater confidence than the findings from any single technique. However, divergent findings are also important because they signal the need for further analysis of a research problem and the cautions to be taken in interpreting the significance of any set of data or any single variable.

On the other hand, the second way to increase validity and reliability, which can be benefited from in just one technique that is in the questionnaires, is to arrange similar questions about the same phenomenon in order to check the accuracy of the responses.

### 3.6. Definition of Concepts and Variables

A selective list of variables has been determined according to the hypotheses and the research questions. Table 3.1 displays the major characteristics of the dependent and independent variables such as their scale type and range. On the other hand, the following explanatory concepts were used in this research:

**Activity-behavior:** Any commercial, recreational, or cultural activity provided within an enclosed outdoor space. In general, activities are the things people are doing. Likewise, Zeisel (1995) defines behavior as referring to thing people do, including thinking, feeling and seeing, as well as talking with others and moving around.

**Space use-Livability:** It is a dimension often employed to measure the success of urban outdoor spaces (Appleyard, 1981). Behavioral attributes including diverse human activities in outdoor spaces.

**Users:** People engaging in different activity types such as eating, talking, sitting, standing or wandering within a public outdoor space are considered as users of the space.

#### 3.6.1. Explanatory Concepts

**Public outdoor space:** Publicly accessible outdoor spaces designed and built for human activity and enjoyment.

**Setting:** A discrete environment in which behavior occurs; within a particular environment.

**Edge effect:** People tend to stay at the edge zones of the space or near the façade of the buildings adjacent to the outdoor space (Alexander, et al, 1977; Gehl, 1987; Hall, 1969). This phenomenon, which exists universally in various types of urban outdoor spaces, is called the “edge effect”.

**Environmental cues:** The physical environment is a network of environmental cues that affect people' choices and feelings, their relationship to the community and their ultimate behavior. People read environmental cues, make judgments about the occupants of settings and act accordingly.

**Use-behavior patterns:** It describes the diversity of activities and how they were carried out, that is, in a group or alone.



Table 3.1. A list of dependent and independent variables – the general area relating to the study.

|                       |                    | MAJOR VARIABLES...                              | scale type | range   | components* |
|-----------------------|--------------------|-------------------------------------------------|------------|---------|-------------|
| DEPENDENT VARIABLES   | USE BY INDIVIDUALS | 1 individual use                                | nominal    | 0-1     | A1          |
|                       |                    | 2 activity diversity by individuals             | ratio      | 1-5     | A2          |
|                       |                    | 3 activity types by individuals                 | nominal    | 1-13    | A3          |
|                       |                    | 4 frequency of activities by individuals        | ratio      | 0.25-25 | A3          |
|                       |                    | 5 specific places for activities by individuals | nominal    | 1-18    | A4          |
|                       |                    | 6 reasons for preferring places                 | nominal    | 1-24    | A5          |
|                       |                    | 7 number of average visits to space             | ratio      | 0.50-75 | A6          |
|                       |                    | 8 occupancy time of each visit                  | ratio      | 2-120   | A7          |
|                       |                    | 9 total occupancy time per week                 | ratio      | 10-1800 | A8          |
|                       | USE BY GROUPS      | 10 group use                                    | nominal    | 0-1     | A9          |
|                       |                    | 11 group size                                   | ratio      | 1-9     | A10         |
|                       |                    | 12 number of meetings with friends per week     | ratio      | 0-50    | A11         |
|                       |                    | 13 occupancy time of each visit                 | ratio      | 2-180   | A12         |
|                       |                    | 14 total occupancy time per week                | ratio      | 10-1650 | A13         |
|                       |                    | 15 activity diversity by groups                 | ratio      | 1-5     | A14         |
|                       |                    | 16 activity types by groups                     | nominal    | 1-15    | A15         |
|                       |                    | 17 frequency of activities by groups            | ratio      | 0.05-35 | A16         |
|                       |                    | 18 specific places for activities by groups     | nominal    | 1-18    | A17         |
|                       |                    | 19 reasons for preferring places                | nominal    | 1-24    | A18         |
|                       |                    | 20 reasons of being in space                    | nominal    | 1-19    | A19         |
|                       |                    | 21 reasons of using space                       | nominal    | 1-19    | A20         |
| INDEPENDENT VARIABLES | 1                  | 22 social interaction                           | interval   | 1-5     | B1          |
|                       |                    | 23 defining physical features                   | nominal    | 1-2     | C1          |
|                       |                    | 24 satisfaction degree with physical features   | interval   | 1-5     | C1          |
|                       |                    | 25 indirect effects of physical features        | interval   | 1-5     | C2          |
|                       | 2                  | 26 degree of enclosure                          | interval   | 1-5     | D1          |
|                       |                    | 27 boundary conditions                          | interval   | 1-5     | D1          |
|                       |                    | 28 transition spaces                            | interval   | 1-5     | D1          |
|                       |                    | 29 use frequency of surrounding buildings       | ratio      | 0-60    | D2          |
|                       | 3                  | 30 aesthetic /visual qualities                  | interval   | 1-5     | E1, E2      |
|                       | 4                  | 31 context                                      | interval   | 1-5     | F1          |
|                       | 5                  | 32 spatial layout                               | interval   | 1-5     | G1          |
|                       | 6                  | 33 diversity of planned activities              | ratio      | 1-3     | H1          |
|                       |                    | 34 types of planned activities                  | nominal    | 1-11    | H2          |
|                       |                    | 35 frequency of planned activities              | ratio      | 1-120   | H3          |
|                       |                    | 36 participation to planned activities          | nominal    | 0-3     | H4          |
|                       |                    | 37 participated planned activities              | nominal    | 1-11    | H5          |
|                       |                    | 38 diversity of participated activities         | ratio      | 1-3     | H6          |
|                       | 7                  | 39 pedestrian movement                          | interval   | 1-5     | I1          |
|                       |                    | 40 frequency of passing through                 | ratio      | 1-200   | I2          |
|                       | 8                  | 41 the most used season                         | nominal    | 1-3     | J1          |
|                       |                    | 42 peak hours                                   | nominal    | 1-3     | J2          |
|                       | 9                  | 43 age                                          | ratio      | 18-32   | K1          |
|                       |                    | 44 gender                                       | nominal    | 1-2     | K2          |
|                       |                    | 45 semester                                     | interval   | 1-6     | K3          |
|                       |                    | 46 length of residency                          | ratio      | 1-10    | K4          |
|                       |                    | 47 attitudes and habits about using outdoors    | interval   | 1-5     | K5          |
|                       |                    | 48 major reasons for use                        | ordinal    | 1-3     | L1          |
|                       |                    | 49 evaluation of each independent component     | interval   | 1-5     | L2          |
|                       |                    | 50 suggestions to make spaces more livable      | nominal    | 1-13    | L3          |

\* This column refers to the question numbers in the questionnaire.

**Diversified settings:** Spatial diversity in the environment where many different types of activities could occur in the same location can be described as settings subject to “multiple meanings” in which consequently varied yet compatible

behaviors occur (Sanoff & Coates, 1971). Thus, this implies that when a setting has a potential to respond to many different types of activities, it can be called a “*diversified setting*”.

**Affective response:** Emotions-feelings and judgments directed toward some component of the environment.

**Behavior generating features:** According to Zeisel (1981), the meaning of behavior in a particular setting depends on the potential of the setting for use. Objects generally imply obvious options for use. In other words, some features of objects or settings offer specific behavior potentials according to those features.

Additionally, there are some new concepts which have been used in this study. The definitions of those concepts include;

**Dominating activity:** While a user engages in two activities at the same time, when s/he has been asked what activity s/he engage in, the one that s/he thinks in her/his mind that s/he is doing; is namely a purposed activity.

**Activity nodes:** It has been noticed that sub-settings represent major activity places in the main setting where activities were frequented and use density became more noticeable during observations. Therefore they can be called “*the activity nodes*” as well. The design features also help to imply the boundaries of these sub-settings spontaneously.

This concept is quite similar to the “*behavioral focal points*” notion in ecological psychology literature. Focal points attract the greatest numbers of different kinds of people; tend to be centrally located, and incorporate several complementary functions such as eating, drinking, socializing, and the selling of goods and services of various kinds (Bechtel, 1987).

### **3.6.2. Dependent and Independent Variables**

Dependent and independent variables that have been used in this study were explained as following:

**Use value:** It is a combination of,

1. Activity diversity (that is, the total number of different types of activities),
2. Frequency of activities (that is, how many times users engaged in activities per week),

3. Use or behavioral density (number of people engaged in activities for a specific period of time),
4. Occupancy time (that is, the total period of time that users spend in the settings).

**Social interaction:** It is the level of interaction that is the most important for the individual's satisfaction. The current study takes social interaction as a confounding variable. It assumes that social interaction increases with more and diverse group activities.

**Enclosure:** Established by the perceived relationships of the elements, which are in three basic types, -objects, surfaces and screens- (as space establishing elements, SEE) according to their position, number, size, shape and direction (Thiel, 1997).

**Transition spaces-Interface:** Physical attributes of the meeting point of inside and outside.

**Context:** Some specific attributes of settings depending upon its place in a broader environment like location and accessibility.

**Physical features:** Physical attributes of both natural landscape elements like greenery, water, etc. and manmade landscape elements like paving, sculptures, fences, walls, structures, etc.

**Aesthetic-visual qualities:** The character of setting as perceived visually by a human observer.

**Spatial layout:** Issues relevant to the design of space including spatial organization, shape and size.

### **3.7. The Proposed Model**

When we consider the literature and previous research reviewed in Chapter Two, it is possible to extract some factors that can be summarized as the major elements-factors affecting the use value.

Considering their relationship with dependent variables, these factors may establish a model which is illustrated in Figure 3.1. In the next chapter, this model's validity will be tested by examining those relationships between independent and dependent variables.

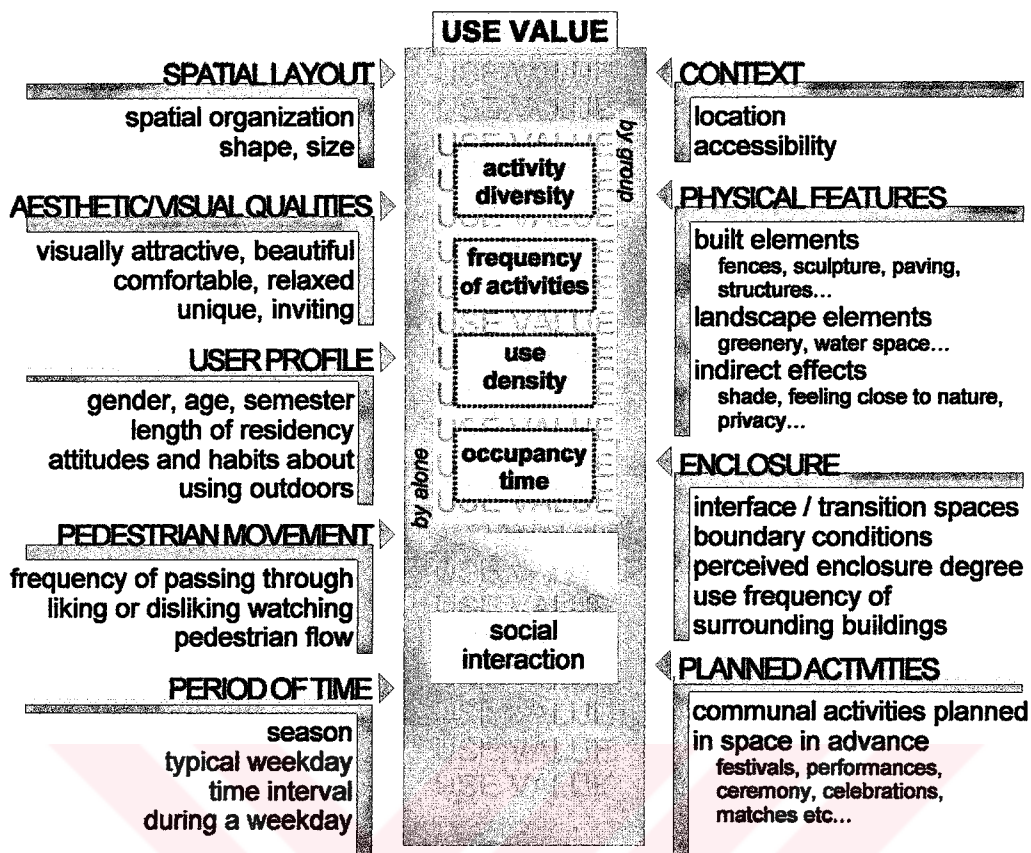


Figure 3.1. The proposed model of the research, which was obtained after the literature review, shows the interactions between the independent and the dependent variables.

### 3.8. Conclusion

This chapter dealt with the research method, which was constructed to carry out the study. It was concluded that using more than one technique would be more appropriate for this study in terms of constructing validity and reliability. Explaining step by step these techniques, it has been seen how these procedures can contribute to the aims of this study. After categorizing and explaining the variables, and proposing the model, which is the main subject of this thesis, the general framework of this study was outlined.

## **4. CASE STUDY**

**"A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are used".**

**(Yin, 1988, p.23)**

**"A case study is appropriate when investigators are interested mainly in information specific to the particular study object or context, rather than information easily generalizable to a large population".**

**(Zeisel, 1981, p.65)**

### **4.1. Introduction**

This chapter presents the findings of observations and questionnaires and, in general, looks into the relationships between independent and dependent variables. Before revealing and evaluating the findings, this current chapter firstly explains the basis of the selection procedure of case study settings, including why campus environments, why METU Campus, and why these three specific settings on the whole campus. Secondly, it introduces the METU Campus with its location, foundation background and the principles guide to the design of the whole settlement. Thirdly, it presents analysis of each of the selected settings, including its location, the description of its physical features through photographs, its location and context and its user identification. Then, it examines the findings of both observations and questionnaires specific to each setting.

A combination of both qualitative and quantitative analysis has been employed during the whole data analysis process. SPSS (Statistical Package for Social Sciences) have been used in order to get the different statistical analysis procedures and understand the data, such as descriptive statistical analysis, factor analysis, correlation analysis and multiple regression. It reveals the results of all these procedures.

Finally, as a preparation to the last chapter, significant findings of all the qualitative and quantitative analyses and their implications are discussed comprehensively in the conclusion of this chapter.



## **4.2. Selection Procedure**

Selection must be logically based on some criteria which is consistent with the purpose of the research. In this respect, the selection procedure has been performed in three steps in the case study as follows:

### **4.2.1. Why Campus Environments as Case Study Settings?**

Campus environments usually constitute a milieu in which urbanity and greenery are pleasantly juxtaposed. Besides, a campus is generally composed of outdoor spaces in different sizes and scales. In this respect, they consist of places where it is relatively comprehensive to evaluate different and diverse spatial attributes. Furthermore, campus environments generally work like a city, as a matter of fact, a city within a city, since they are usually planned to meet all the needs of students in close distances without the students needing to go to the city-center. For instance, they generally consist of a cultural center, recreation fields, sports facilities, an accommodation area and a commercial center, except for the administrative units and faculties. The mix-used qualities mentioned above make them functionally enriched and capable of being an indoor-outdoor activity combination. In this regard, campus environments offer places for a wide range of student activities in outdoor spaces.

Secondly, user profile of campus environments roughly shares common qualities like age group and background. In this sense, campus outdoor spaces offer an important advantage as case study settings to researchers because their user group is not as diverse as those of other types of outdoor spaces within a city. Students are within a specific age group, and they share a relatively similar background. Because of this, it is easier to gather and analyze the data (Yildiz & Şener, 2003).

Finally, even though designing and building new university campuses is currently a significant issue for a developing country like ours, and is a process that seems likely to continue in the near future, little research has touched on this topic. Most of the literature on campus outdoor spaces undertakes the issue from a planning point of view, or deals mostly with the design of campus buildings, rather than the spaces between them. There is not enough research results dealing with campus life in outdoor spaces between buildings especially in Turkey's campus environments, like the significant work of Cooper-Marcus and Francis (1990) that they carried out on many American campus environments (see Chapter 2).



#### 4.2.2. Why METU Campus?

The case study was conducted at the Middle East Technical University Campus located in Ankara. Before the selection of this campus environment, seven different campuses in Istanbul and Ankara were visited in order to determine whether the campuses were suitable for the study (see Appendix E). These initial samples of settings were the main, well-known campuses of Turkey, which are the campus of Istanbul Technical University (ITU), of the Bosphorus University (BU), of Yildiz Technical University (YTU), of Koç University (KU), of Sabancı University (SU) in Istanbul, and of Bilkent University (BU), of Middle East Technical University (METU) in Ankara.

Use densities, having diverse activities and physical features, total student population, and the spatial layout were among the main considerations for selections. The use densities of outdoor spaces on the campuses of ITU, KU, and SU were found to be quite low. Basically, since ITU Campus was not planned according to the orientation of the pedestrians, vehicle traffic seems to dominate much more. Naturally, this affects the outdoor livability in a negative sense.

On the other hand, KU (Koç University) and SU (Sabancı University) were established in the last decade as private universities. Both of these universities were designed with some references to the traditional Turkish architecture by carrying some Turkish motives such as large eaves and geometrical symmetry in buildings; and reflecting some of the principles, which were used in the building complexes of Ottoman Period like shaded arcades and enclosed courtyards (Arredomento Mimarlık, 2000). However, their student population is quite low in comparison with the older state universities and inevitably this factor affects their use densities.

The campuses of BU (Boğaziçi University) and YTU were not planned as a campus, but were converted into campus environments after a time. Because of this, they consist of some historical buildings built in different periods reflecting different styles. Naturally, this leads to some significant differences in the perception of the campus environments. BU is also composed of different campus parts, therefore, not having a total campus environment.

The Campus of Bilkent University in Ankara is quite similar to the METU Campus in terms of design layout. The linear organization of campus buildings provides a main pedestrian alley between buildings. Even though the campus model is the same with the METU, its outdoor spaces are not as lively as in METU Campus.

Being used as a campus from the beginning of the early 1960's, the METU campus seemed the most suitable campus environment in terms of its compatibility for the purposes of this research. The outdoor spaces are not only very livable, but also the outdoor space quality is very pleasing with their diverse physical features and spatial layouts. The most important point here is that being one of the oldest and biggest university campuses in Turkey, its outdoor space use has a settled and steady character.

#### **4.2.3. Why These Settings on the Campus?**

The selection process of each setting was based on both its use qualities, such as its use densities and diverse activities occurring there, and its diverse physical features. Considering these criterion, the first observations were made in settings along the pedestrian alley during the lunch hours, specifically between 12.10 a.m. and 1.10 p.m. on the same weekday. Based on these initial observations, use densities of outdoor spaces along the pedestrian alley have been illustrated in Figure 4.1.

According to the information obtained from this map, the outdoor campus space surrounded by the Library Building and the Mathematical Department's Building (setting A); the outdoor campus space which is surrounded by the Presidency Building and the Physics Building (setting B); the outdoor campus space surrounded by the Chemistry Building, the Main Cafeteria, and the MM building (setting C) were selected as the case study settings (Figure 4.2).

Selected settings are the ones that users mostly preferred, and thus heavily used outdoor spaces on the campus. Moreover, there seemed to be a high probability of different use patterns here regarding varying characteristics of the settings in comparison with the other public outdoor spaces of the campus.

### **4.3. About METU Campus**

#### **4.3.1. Location and Context**

The METU (Middle East Technical University) Campus is located on the Ankara-Eskişehir highway in Ankara. In 1963, the University moved to its current campus location which was the first university campus in Turkey. The site which the campus is located on has a natural landscape, 4500 hectares of which is campus area and



Figure 4.1. Use densities of outdoor spaces along the pedestrian alley.



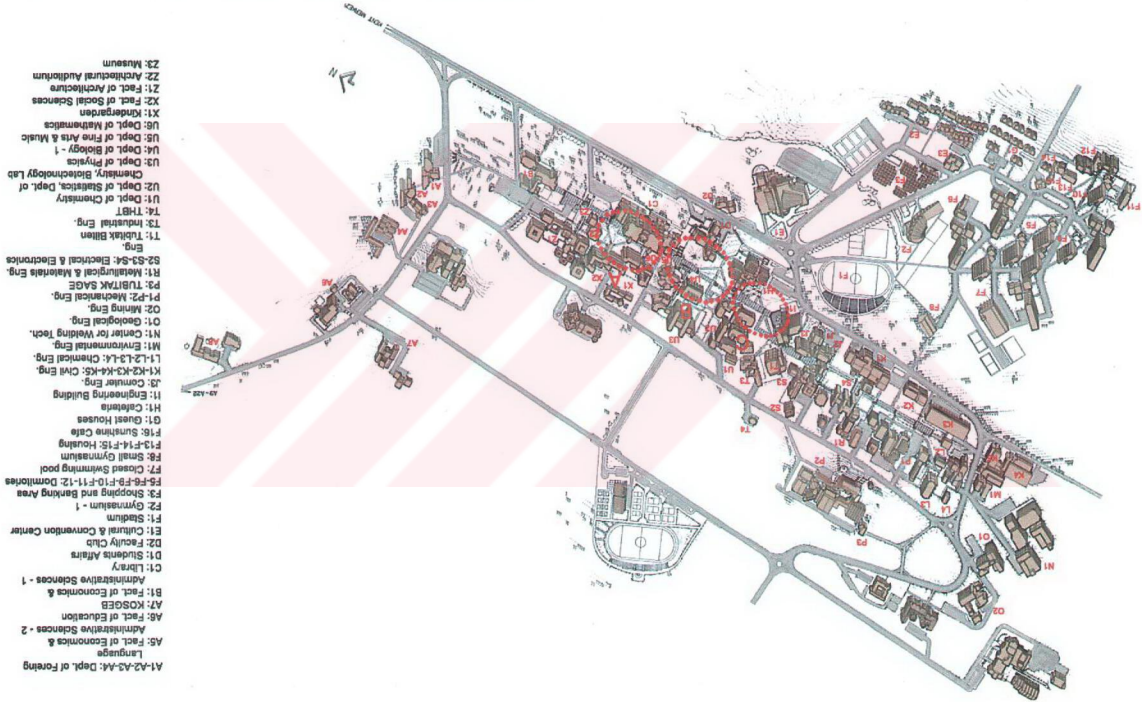


Figure 4.2. A perspective view from the METU Campus indicating three selected settings (Building and Technical Office of METU, 2003).

3043 hectares is the forest area, including Lake Eymir, about 20 kilometers away from the centrum of Ankara (Figure 4.3).

When it was first planned, the settlement was out of the city. After the urban sprawl, even though its territory was surrounded by the walls, the campus today shows quite high integration with the city by being an activity center throughout the day and night. Offering education over 20,000 students, the campus hosts many events and activities. Throughout the academic year, students can enjoy art exhibitions, concerts, recitals, cinema and theater events as well as a variety of social and academic activities. The lake is also available to students for rowing, fishing, picnicking and general recreational activities (METU, 2004).



Figure 4.3. Aerial site photo of METU Campus (Kurdas, 1998, p.140).

The campus area has the panorama of the city of Ankara on the eastern and northern side, tranquil nature on the western side and a landscape view of mountains on the southern side (Mimarlık, 1965) (Figure 4.4).



Figure 4.4. A view from the roof of the library to the north-east of METU campus in May of 2003.

#### 4.3.2. Foundation of METU

After the Second World War, the transformation in the political, economic and social structure in the 1950's caused Turkey to introduce the American university system into Turkish higher education. These socio-political changes were the main determining factors in the idea of founding a university campus settlement with its planning decisions as a settlement in 1956 (Uçar, 2001). In this period, the campus was basically designed under the influences of International Style. Turkish architects turned their faces to western modern architecture with a design understanding of connecting building groups, made of basic geometric forms, according to rational and functional rules.

After a national competition, which was arranged and resulted in today's campus settlement in 1961, the proposal of Altuğ and Behruz Çinici won the first prize. Regulating and guiding the production of the settlement, the architects also controlled the construction stages after the design. The structure of the campus was wholly designed at once, but the construction was carried out stage by stage.

#### 4.3.3. Design Principles

A holistic and deductive design approach was applied by the architects. The main criterion of the design was pedestrian circulation. In fact, the concept of a "*walking campus*" was introduced to Turkish Architecture by this project. The settlement consisted of three main zones, that is, (1) the academic district, (2) the non-academic district, and (3) the center (Mimarlık, 1965). Then these zones were graded along the main pedestrian alley, which extends straight for one kilometer, and was surrounded by a ring-road (Figure 4.5). In this way, the project was first separated into functional sub-structures (zoning) and then they were related to each other in a hierarchy to get back totality.

The main pedestrian alley was thought as "*forum*" by Çinici's before, in other words 'open academic square'. It was the place in the campus where space and actions controlled. While zoning is determined by the topography of the land, forum that defines hierarchy and connections between zones is designed depending on appropriate pedestrian walkway distance decisions. According to this stipulation, walking from one end of the campus to the other takes 20 minutes (Uçar, 2001).

The academic district extends through the main entrance on the north-south axis, which is arranged in a row on the west side of the main artery. The ring-road



provides easy pedestrian transportation to the forum. The central district is located in the center of the academic district on the east side of the main artery including the administrative building, the library and the main cafeteria. The non-academic district is located on the northeast side of the forum including dormitories, houses for the academicians, sport facilities and shopping centers (Uçar, 2001).



Figure 4.5. Two views from the pedestrian alley, the first one of which was in 1969 (Kurdaş, p.140), and the other was in May 2003.

The forum, that is the designed open-public space of the campus, provides continuation of voids between buildings, connects them to each other along the main pedestrian alley and takes shape according to the landscape decisions which can be defined by air, sun, greenery strategies. Creating continuity between inner and outer spaces, the pedestrian alley becomes an integrating element between buildings and outdoor spaces and buildings surrounding the main alley took forms from the common characteristics of this following space (Figure 4.6).



Figure 4.6. Two focused views from the pedestrian alley.

Today METU Campus is like a city within a city, it is even lively at nights, especially during summer, with its rich landscape and one of the most favored social activities, which is the traditional International Spring Festival held in May, spreading out on to the whole campus (Figure 4.7).



Figure 4.7. Two views from the activities taking place during the traditional spring festival as a significant event, even drawing many people out of the campus.

#### 4.4. Analysis of Setting A

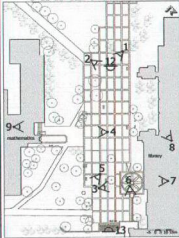
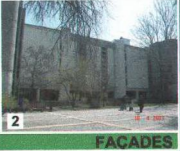
##### 4.4.1. Descriptive Analysis

**Location and Context:** The outdoor campus space, surrounded by the Library Building and the Mathematical Department's Building, was selected as the first setting (setting A) for the case study due to the information obtained from the initial observations. According to these observations, it is one of the most heavily used and favorite outdoor spaces on the campus. Being one of the central outdoor spaces on the pedestrian alley, it is located on the northern side of the Middle East Technical University Campus (see also Appendix G and H).

**User Identification:** It is possible to see a wide range of student activities in this setting. Due to the library, students from almost all of the departments use this space. But the preparatory and freshmen use this space more frequently than other students, since they have some classes in the Mathematical Department. The users of this setting are students who are generally between the ages of 19-32.

**Spatial and Physical Attributes:** Table 4.1 indicates the analysis of this setting with successful and unsuccessful features and the specific elements like enclosing façades, entrances-front yards, focal points-sculptures, transition spaces and aerial views.

Table 4.1. Analysis of setting A with its physical features.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                            |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>ANALYSIS of</b></p>  <p><b>SETTING A</b></p>                                                                                                                                                                                                                                                                                                                                                                                                        | <p>1</p>  | <p>2</p>  <p><b>FAÇADES</b></p> | <p><b>Successful Features</b></p> <ul style="list-style-type: none"><li>▪ The outdoor space has a central location</li><li>▪ The main sculpture forms an attractive focal point.</li><li>▪ Busts visually enhance the space</li><li>▪ Buildings funnel pedestrian traffic well.</li><li>▪ The front yard of the Library Building serves as a good meeting place</li><li>▪ Greenery is sufficiently rich</li><li>▪ Bounded by one of the highly used buildings in the whole campus, that is the Library</li><li>▪ Variety of green and hard-surfaced sub-settings</li></ul> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p>3</p>  | <p>4</p>                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <p><b>ENTRANCES-FRONT YARDS</b></p>                                                        |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>5</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                  | <p>6</p>  |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>Unsuccessful Features</b></p> <ul style="list-style-type: none"><li>▪ Sittable space is insufficient</li><li>▪ Fountains have no water.</li><li>▪ Bench design is very poor and not comfortable, since they have no back</li><li>▪ Lawns are not well kept, except the one which is in front of the MB</li><li>▪ Food options are limited</li><li>▪ The setting is not wide enough</li><li>▪ Paving is uneven, making walking difficult</li><li>▪ No bike pathway</li><li>▪ No flowers to enrich the colors of the setting</li></ul> |                                                                                            | <p>7</p>                        | <p>8</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                            | <p><b>TRANSITION SPACES</b></p>                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                            | <p>10</p>                       | <p>11</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                                                                                            | <p><b>AERIAL VIEWS</b></p>                                                                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>12</p>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                            |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p>13</p>                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                            |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <p><b>SILHOUETTES</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                            |                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |



The whole setting was examined under seven sub-settings (Table 4.2). Setting A is the first space at the beginning of the pedestrian alley connected by a wide staircase to the space between the Physics Building and the President's Office Building, which is setting B. It is surrounded on two sides by buildings: on the west by the Mathematical Department's Building and on the east by the Library. The space has both landscaped and paved parts at just one level. It includes the front yards of, and entrances to, the Library and Mathematical Department's Building. There is a small canteen that serves limited food options on the ground floor of the Mathematical Department's Building. There are also many shaded trees in the entire setting, and some statues in front of the Library Building.

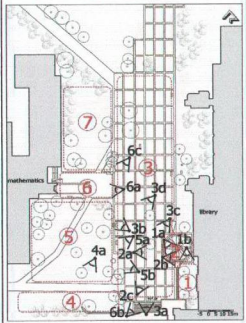
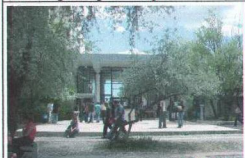
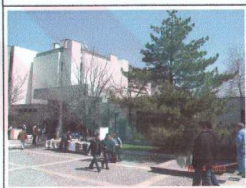
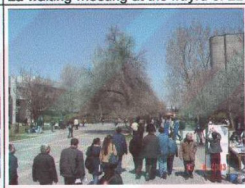
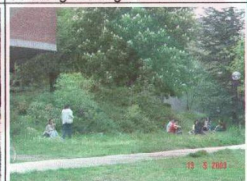
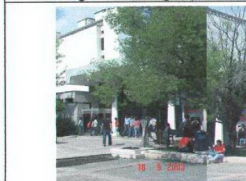
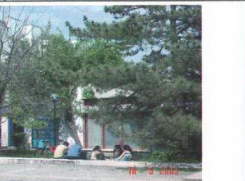
Bounded by a water fountain, the first sub-setting is on the right hand side of the entry point to the library, including a small grass area. The second sub-setting is the front yard of the Library which serves as a meeting place for the entire campus. Visual cues indicate the presence of the front yard of the Library successfully. The third sub-setting is the circulation area along the main setting, including a row of benches and trees. The fourth, the fifth and the seventh sub-settings are the grassy areas with shaded trees. Being located in front of the Mathematical Department's Building, the fifth one includes the main sculpture which creates an important focal point in the space. The sixth sub-setting is the front yard of the Mathematical Department's Building, which has a water fountain in bad condition without water.

#### **4.4.2. Findings of Observations**

The total number of users, who were observed throughout five weekdays, was 742 people, of which 326 were female and 416 male. The area is about 4750 m<sup>2</sup> and the number of people per m<sup>2</sup> is  $742/4750 = 0.15$ . The behavioral density for this setting is about  $4780/742 = 6.44$ . Representing the total composite of the data, the behavioral map (Figure 4.8) illustrates the behavioral densities and their locations.

Table 4.2 presents sub-settings and the activity nodes in setting A, illustrating different kinds of activities, which were observed in each sub-setting. In the first sub-setting, waiting, meeting and chatting are the primary activities. Students can sit; wait for their friends, and chat, as this space consists of ledges. A water fountain and a small bust make this sub-setting adequately visually rich. The second sub-setting is the favorite meeting place on the whole campus. Students who are, or intent on, studying at the library wait, meet, have short conversations and a cigarette break.

Table 4.2. Activity nodes in setting A: Diverse activities located in sub-settings.

|                                                                                                                                           |                                                                                                                                  |                                                                                                                                |
|-------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| <p><b>ACTIVITY NODES</b></p>  <p>in <b>SETTING A</b></p> |  <p>1a sitting along the ledges</p>             |  <p>1b studying on the lawns alone</p>        |
|                                                                                                                                           |  <p>2a waiting-meeting at the frt.yrd of LB</p> |  <p>2b selling-buying tickets, pamphlets</p>  |
|  <p>2c selling student newspaper</p>                     |  <p>3a passer byes through the setting</p>      |  <p>3b sitting-chatting on the benches</p>    |
|  <p>3c advertising students' club activities</p>         |  <p>3d watching passer byes</p>                 |  <p>4a resting in groups on lawns</p>         |
|  <p>5a listening to music in groups</p>                |  <p>5b resting and chatting in groups</p>     |  <p>6a chatting on the front yard of MB</p> |
|  <p>6b a silhouette of the front yard of LB</p>        |  <p>6c having a break between classes</p>     |                                                                                                                                |



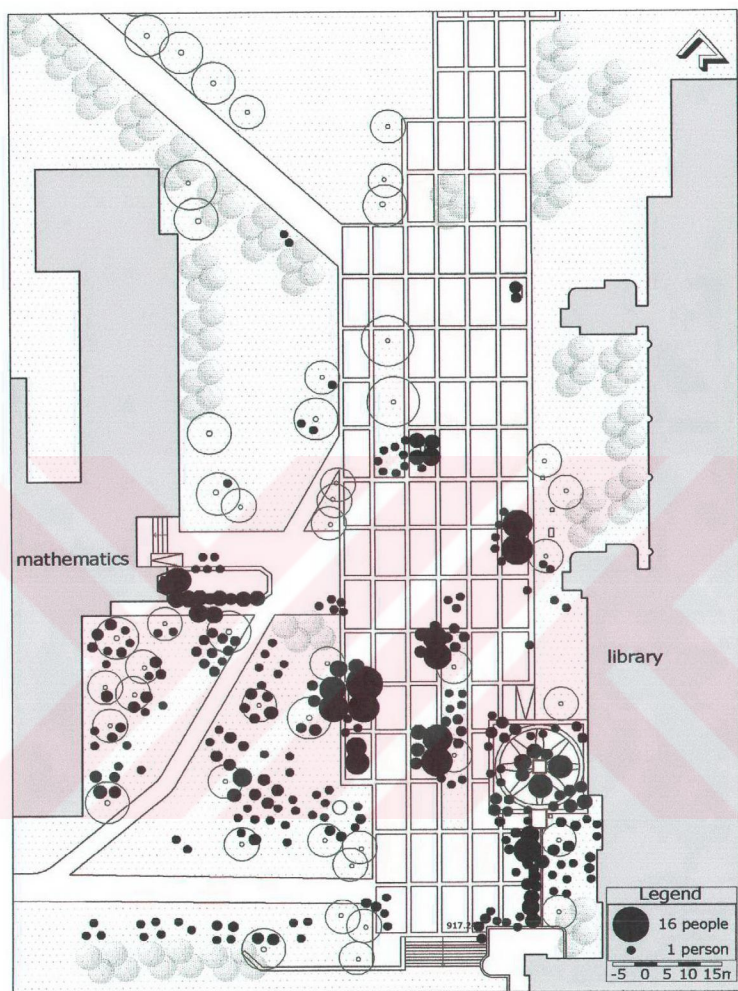


Figure 4.8. Behavioral mapping of setting B, which shows the location of people\*.

\* Circle size corresponds to the behavioral density in specific locations. Data was based on the total number of people observed during the time intervals, which was from 12.10 a.m. to 1.10 p.m. including five weekdays.

The third sub-setting is an ideal place for sitting-resting, watching and chatting, as it offers sitting options on benches. The fourth sub-setting offers places where

students can sit on the lawns while chatting and having lunch. Sub-setting five has some quiet areas under shaded trees, which are suitable for studying-reading, listening to music; and it is quite convenient for students to gather in groups. Sub-setting six has places where students take short breaks between classes. The seventh sub-setting is under-used as it appears clear in the behavioral mapping.

From the observations, one of the highest behavioral densities was found in the front yards of the two surrounding buildings. Sub-setting five also received first degree highest use density. The second highest frequency places were those locations in sub-setting three that included benches. The behavioral density is quite high at the entry points along the façades, that is, where there is a relationship between an indoor and outdoor space. Along the straight edges of the façades there is a decrease in use density, suggesting that there are not enough visual cues to afford activities.

#### **4.4.3. Findings of Questionnaires**

In the analysis of the first part of the questionnaires, four people of total respondents (n=70) indicated that they do not use this setting by themselves, they only engaged in group activities. However, only one person specified that s/he does not use the space in groups. 65 of those 70 respondents use this setting both individually and in groups.

Analysis of the activities conducted alone by the users in this setting indicated that the most frequent activities were, in order, sitting-resting (51.5%), studying-reading (43.9%) and waiting (43.9%). Other activities conducted alone, which were eating-drinking (22.7%), having a break-spending some time (15.2%), playing guitar-listening to music (13.6%), smoking (12.1%), are of second-degree importance. Having a frequency of less than 10% of cases and of less importance are the activities of selling or buying tickets-magazines-pamphlets, lying down on lawns-sleeping and watching people-around, which have been combined under the heading of "other activities" (Table 4.3).

Users also were asked how many times they were engaged in these activities per week. They specified that they were engaged in sitting-resting at an average six times (mean: 6.06), studying-reading four times (mean: 3.90), waiting four times (mean: 3.58), eating-drinking four times (mean: 4.23), having a break-spending time nearly eight times (mean: 7.50), playing guitar-listening to music nearly four times

(mean: 3.74) and smoking nearly fourteen times (mean: 13.85) per week (Table 4.4). According to this data, the activity type that users engaged in least, that is smoking, has the highest frequency among all other activity types.

Table 4.3. Activities conducted alone in setting A.

| Activities conducted alone        | response   | % of responses | % of cases*     |
|-----------------------------------|------------|----------------|-----------------|
| Sitting-resting                   | 34         | 24.3%          | 51.5%           |
| Studying-reading                  | 29         | 20.7%          | 43.9%           |
| Waiting                           | 29         | 20.7%          | 43.9%           |
| Eating-drinking                   | 15         | 10.7%          | 22.7%           |
| Having a break-spending time      | 10         | 7.1%           | 15.2%           |
| Playing guitar-listening to music | 9          | 6.5%           | 13.6%           |
| Smoking                           | 8          | 5.7%           | 12.1%           |
| Other activities                  | 6          | 4.3%           | 9 %             |
| <b>Total</b>                      | <b>140</b> | <b>100%</b>    | <b>211.9%**</b> |

\* 4 missing cases, 66 valid cases

\*\* Respondents could specify more than one activity; therefore the total does not add up to 100 percent.

Table 4.4. Frequency of major activity types conducted alone.

| Frequency of activities conducted alone        | min. | max.  | mean  | SD   |
|------------------------------------------------|------|-------|-------|------|
| Frequency of sitting-resting                   | 1.00 | 20.00 | 6.06  | 5.72 |
| Frequency of studying-reading                  | 0.25 | 15.00 | 3.90  | 3.31 |
| Frequency of waiting                           | 1.00 | 10.00 | 3.58  | 2.61 |
| Frequency of eating-drinking                   | 0.50 | 10.00 | 4.23  | 2.90 |
| Frequency of having a break-spending time      | 0.50 | 20.00 | 7.50  | 6.96 |
| Frequency of playing guitar-listening to music | 0.70 | 10.00 | 3.74  | 2.90 |
| Frequency of smoking                           | 5.00 | 25.00 | 13.85 | 7.12 |

within the group activities, chatting (82.6%), eating-drinking (29.0%), studying-reading (24.6%), meeting (23.2%), sitting-resting (15.9%), and sports activities (15.9%) are the most frequent ones (Table 4.5). On the other hand, activities conducted in groups like games, selling or buying tickets-magazines-pamphlets, playing an instrument-listening to music, smoking, watching people-around, student clubs' activities, waiting, having a break-spending time, lying down on lawns-sleeping have less than the frequency of 10% of cases, which were combined as other activities in Table 4.5.

Table 4.5. Activities conducted in groups in setting A.

| Activities conducted in groups | response   | % of responses | % of cases*     |
|--------------------------------|------------|----------------|-----------------|
| Chatting                       | 57         | 37.0%          | 82.6%           |
| Eating-drinking                | 20         | 13.0%          | 29.0%           |
| Studying-reading               | 17         | 11.1%          | 24.6%           |
| Meeting                        | 16         | 10.4%          | 23.2%           |
| Sitting-resting                | 11         | 7.1%           | 15.9%           |
| Sports activities              | 11         | 7.1%           | 15.9%           |
| Other activities               | 22         | 14.3%          | 31.9%           |
| <b>Total</b>                   | <b>154</b> | <b>100%</b>    | <b>223.1%**</b> |

\* 1 missing case, 69 valid cases

\*\* Respondents could specify more than one activity; therefore the total does not add up to 100 percent.



Indicating the level of activity diversity, there are six major different types of activities that occurred in setting A, both by individual and group users; they are sitting-resting, studying-reading, eating-drinking, chatting, waiting and meeting, as shown in Table 4.3 and 4.5.

Respondents were also asked to specify the frequency of group activities. According to the data, they were engaged in chatting nearly seven times (mean:7.43), eating-drinking five times (mean: 4.53), studying-reading four times (mean: 3.94), meeting six times (mean: 5.65), sitting-resting five times (mean:5.00), and sports activities three times (mean:3.35) per week (Table 4.6). Chatting as the activity type that many of the respondents (82.6%) mentioned (in Table 4.5) is also the most frequent activity among the other activities.

Table 4.6. Frequency of major activity types conducted in groups.

| Frequency of activities conducted in groups | min. | max.  | mean | SD   |
|---------------------------------------------|------|-------|------|------|
| Frequency of chatting                       | 0.60 | 35.00 | 7.43 | 7.20 |
| Frequency of eating-drinking                | 1.00 | 10.00 | 4.53 | 2.87 |
| Frequency of studying-reading               | 0.50 | 10.00 | 3.94 | 2.94 |
| Frequency of meeting                        | 1.00 | 20.00 | 5.65 | 5.46 |
| Frequency of sitting-resting                | 1.00 | 20.00 | 5.00 | 5.59 |
| Frequency of sport activities               | 0.05 | 10.00 | 3.35 | 3.95 |

Respondents were also asked to indicate a specific place for each activity that they engaged in this setting. For all kinds of activities, sub-setting A5 has been mostly specified both by individuals (56.3%) and group users (71%) (Table 4.7). The average place preferences for sub-setting A3 is 37.5% in individual use, 15.9% in group use; for sub-setting A2 is 28.1% in individual use and 29.0% in group use; for sub-setting A1 is 14.1% in individual use, 7.2% in group use; for sub-setting A6 is 17.2% in individual use, 8.7% in group use. According to the questionnaire results, sub-settings A4 and A7 were underused (Table 4.7).

Table 4.7. The preference ratios of sub-settings shows use density of each sub-setting in setting A.

| Preference ratios of sub-settings for all kinds of activities | individual users |                  | group users |                  |
|---------------------------------------------------------------|------------------|------------------|-------------|------------------|
|                                                               | response*        | percentage       | response**  | percentage       |
| Sub-setting A5                                                | 36               | 56.3%            | 49          | 71.0%            |
| Sub-setting A3                                                | 24               | 37.5%            | 11          | 15.9%            |
| Sub-setting A2                                                | 18               | 28.1%            | 20          | 29.0%            |
| Sub-setting A1                                                | 9                | 14.1%            | 5           | 7.2%             |
| Sub-setting A6                                                | 11               | 17.2%            | 6           | 8.7%             |
| Sub-setting A7                                                | 4                | 6.3%             | 3           | 4.3%             |
| Sub-setting A4                                                | 1                | 1.6%             | 1           | 1.4%             |
| <b>Total</b>                                                  | <b>103</b>       | <b>161.1%***</b> | <b>95</b>   | <b>137.5%***</b> |

\* 6 missing cases, 64 valid cases,

\*\* 1 missing case, 69 valid cases

\*\*\*Users could specify different specific places in one sub-setting for different activities; therefore the total does not end up at 100 percent.

It is worth noting here that many of the users preferred sub-setting A5 as their first choice for sitting-resting, studying-reading, eating-drinking (as groups), having a break-spending time, playing guitar-listening to music, chatting and sports activities (Table 4.8). This implies that sub-setting A5 is “the most diversified sub-setting” among all other sub-settings, since it has a potential to respond to many different types of activities. For the waiting and meeting, sub-setting two was dominantly preferred since it is a well-known, specific place on the whole campus. For smoking, and eating-drinking by individuals sub-setting three was preferred.

Table 4.8. A match between activities conducted alone and in groups and sub-settings showing sub-setting preferences for each activity type.

| ACTIVITIES                              | SUB-SETTINGS |       |       |      |       |       |      | TOTAL |
|-----------------------------------------|--------------|-------|-------|------|-------|-------|------|-------|
|                                         | A1           | A2    | A3    | A4   | A5    | A6    | A7   |       |
| Sitting-resting (by individuals)        | 11.8%        |       | 23.5% | 2.9% | 47.1% | 5.9%  | 8.8% | 100%  |
| Sitting-resting (by groups)             | 9.1%         |       |       |      | 72.7% | 9.1%  | 9.1% | 100%  |
| Studying-reading (by individuals)       |              |       | 6.9%  | 1.4% | 89.7% |       | 5.9% | 100%  |
| Studying-reading (by groups)            |              |       |       |      | 94.1% |       |      | 100%  |
| Waiting (by individuals)                | 13.8%        | 41.4% | 17.2% |      | 3.4%  | 24.1% |      | 100%  |
| Eating-drinking (by individuals)        |              |       | 53.3% |      | 40.0% | 20.0% | 6.7% | 100%  |
| Eating-drinking (by groups)             |              |       | 15.0% |      | 65.0% |       |      | 100%  |
| Having a break-spending time (by in.)   |              | 10%   | 30.0% |      | 50.0% | 10.0% |      | 100%  |
| Playing guitar-listening to music(ind.) | 22.2%        |       | 11.1% |      | 66.7% |       |      | 100%  |
| Smoking (by individuals)                | 25%          |       | 50.0% |      |       | 25.0% |      | 100%  |
| Chatting (by groups)                    | 8.8%         | 7.0%  | 12.3% | 1.8% | 61.4% | 3.5%  | 5.3% | 100%  |
| Sports activities (by groups)           |              | 10.0% |       |      | 90.0% |       |      | 100%  |
| Meeting (by groups)                     |              | 93.3% | 6.7%  |      |       |       |      | 100%  |

Students spent approximately equal time in this setting when they were alone and in pairs or groups. The average group size is composed of four (mean: 4.25) people. Students meet with their friends seven times per week (number of visits per week) (mean: 7.19), whereas the number of visits made by people alone per week is 10 (mean: 10.8). The duration of each visit is on average 37.90 minutes in group use, 30.30 minutes in individual use, and the total occupancy time in group use is 309.96 minutes (~5 hours) per week, while this duration is 322.81 minutes (~5 hours) in individual use per week (Table 4.9).

Table 4.9. Occupancy time of users in setting A.

| Occupancy time                   | individual users |        |        | group users |        |        |
|----------------------------------|------------------|--------|--------|-------------|--------|--------|
|                                  | response         | mean   | SD     | response    | mean   | SD     |
| Number of average visit per week | 66               | 10.08  | 7.34   | 68          | 7.19   | 6.07   |
| Occupancy time of each visit     | 66               | 30.30  | 21.09  | 69          | 37.90  | 29.56  |
| Total occupancy time per week    | 66               | 322.81 | 363.79 | 69          | 309.96 | 329.27 |

The major finding about the responses to semantic differential scales implied positive associations with setting A, indicating the perceived image and the meaning



of this setting kept by users. It was observed that responses almost overlapped with common selections on positive adjectives such as attractive, inviting, comfortable, beautiful, relaxed and unique. Mean values of responses between the male and female groups to semantic scales yielded only subtle differences (Figure 4.9).

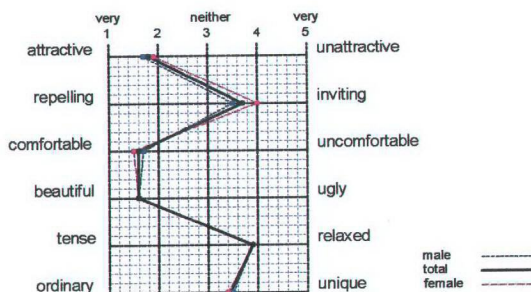


Figure 4.9. Adjective scale rating measuring the meaning of setting A held by users.

Overall, the data for setting A proved that there is a consistency between the results of observations and questionnaires. Specifically, the behavioral density of the sub-settings that can be seen from behavioral mapping is totally consistent with the place preference results of the questionnaires. When the group use and individual use were compared for this setting, it was found out that waiting in individual use was seen as different from group activities; meeting and chatting were noticed as different from individual activities in terms of activity types. On the other hand, there is no significant difference in terms of occupancy time.

## 4.5. Analysis of Setting B

### 4.5.1. Descriptive Analysis

**Location and Context:** The outdoor campus space encircled by the Presidency Building, the Physics Building and the Library was selected as the second case study setting. This second setting is subsequent of the first setting on the pedestrian alley. According to the information obtained from the initial observations, it is one of the other most heavily used outdoor spaces on the campus. Being one of the central outdoor spaces on the whole campus at the same time, it is located almost on the middle of the pedestrian alley; maybe therefore, that is why it is called as the “*heart of METU*” by the students (see also Appendix G and H).

**User Identification:** It is possible to see a wide range of student activities in this space. Due to the open grassy slope area around the monument of Atatürk, students from almost all of the departments use this space. Again, the users of this setting are students who are generally between the ages of 18-25.

**Spatial and Physical Attributes:** Table 4.10 indicates the analysis of this setting with successful and unsuccessful features and the specific elements like enclosing façades, entrances, focal points-sculptures, transition spaces and aerial views.

Setting B is connected by a wide staircase to setting A and setting C, in other words it is in the middle of setting A and setting C on the pedestrian alley. It is surrounded on three sides by buildings: on the west by the Physics Department's Building and on the east by the Presidency Building, and on the north by the Library. The space has both landscaped and paved parts at different levels.

The whole setting was examined under five sub-settings (see Table 4.11). The first sub-setting is the front yard of the Department of Biology and the Department of Physics, including an entry to the auditorium with good transition spaces, and a small canteen on the ground floor of the Department of Physics. The second sub-setting is the circulation area along the main setting which includes benches and trees. The fourth sub-setting is the open slopey grass area around the monument of Atatürk, which is a well-known place on the whole campus and thus serves as a good meeting place.

This central monument creates an important focal point in the on the entire campus where graduation photographs are taken by all of the departments. A line of trees in front of the President Office Building creates a screen like an enclosing wall on the east of the fourth sub-setting. Sub-setting five, where small performances were taken place sometimes, is on the lower level, including an entry point to the Department of Fine Arts and Music.

#### **4.5.2. Findings of Observations**

The total number of users, who were observed through five weekdays, was 880 people, of which 394 were female and 486 male. The area is about 10.270 m<sup>2</sup> and the number of people per m<sup>2</sup> is  $880/10.270 = 0.085$ . The behavioral density for this setting is about  $10.270/880 = 11.67$ . Representing the total composite of the data, the behavioral map (Figure 4.10) illustrates the behavioral densities and their locations.

Table 4.10. Analysis of setting B with its physical features.

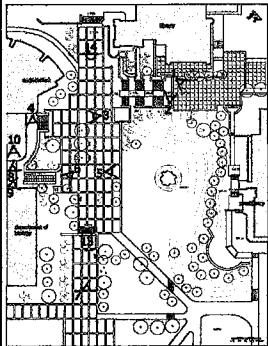
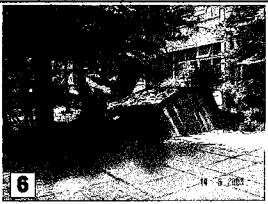
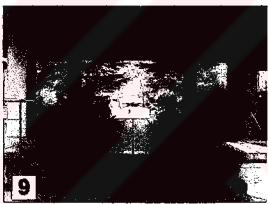
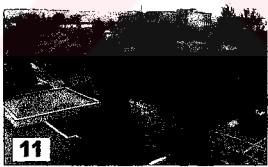
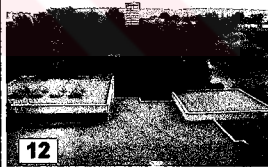
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div>ANALYSIS of</div> <div></div> <div>SETTING B</div>                                                                                                                                                                                                                                                                                                                                                                        | <div>1</div> <div></div> <div>2</div> <div></div>                                                                                                                                                                       | <div>Successful Features</div> <ul style="list-style-type: none"><li>▪ The outdoor space has a central location</li><li>▪ The monument of Atatürk forms an attractive focal point</li><li>▪ Many definable sub-spaces and diverse use zones at different levels allowing diversity in the scale</li><li>▪ Tree placements enhance sense of eddy spaces for seating</li><li>▪ Trees contribute to defining the setting</li><li>▪ Busts visually enhance the space</li><li>▪ Greenery is sufficiently rich</li><li>▪ Visible and accessible from many directions</li><li>▪ Highly used seating edge/ wall</li><li>▪ Visually rich, covered well-used transition spaces from indoors</li></ul> |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | ENTRANCES-FRONT YARDS                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <div>5</div> <div></div>                                                                                                                                                                                                                                                                                                                                                                                                       | <div>6</div> <div></div>                                                                                                                                                                                                                                                                                 | <div>7</div> <div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <div>Unsuccessful Features</div> <ul style="list-style-type: none"><li>▪ No water fountain</li><li>▪ Bench design is very poor and not comfortable, since they have no back</li><li>▪ Paving is uneven, making walking difficult</li><li>▪ No bike pathway</li><li>▪ No flowers to enrich the colors of the setting</li><li>▪ The size of the setting is too large in scale</li><li>▪ Since watering is not scheduled, grassy areas are usually wet, thus sitting can not be accommodated comfortably</li></ul> | <div>8</div> <div></div>                                                                                                                                                                                                                                                                                | <div>9</div> <div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TRANSITION SPACES                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | <div>11</div> <div></div>                                                                                                                                                                                                                                                                              | <div>12</div> <div></div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | AERIAL VIEW                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <div>13</div> <div></div>                                                                                                                                                                                                                                                                                                                                                                                                    | <div>Provides places suitable for socializing with others, as well as for intimacy and privacy</div> <div>▪ Many entrances at different levels</div> <div>▪ Open grassy slope area allows watching performances at lower platform and lying down on the grass as well</div> <div>▪ Visually rich perspectives</div> <div>▪ Ease of circulation</div> <div>▪ Take-out food available</div> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <div>14</div> <div></div>                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| SILHOUETTES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

Table 4.11 presents sub-settings and the activity nodes in setting B, illustrating different kinds of activities which were observed in each sub-setting. In the first sub-setting, eating, waiting, meeting and chatting are the primary activities. Having diverse spatial characteristics such as the covered transition spaces, ledges, platforms on different levels, ramps, steps and grassy open areas, students use the first sub-setting quite densely. For instance, since this setting is very close to the canteen, students usually eat their lunches while they are chatting especially in groups there; waiting for the cinema in the Auditorium; having breaks when they are studying in the laboratories in the biology department; playing guitar and listening to it on the lower small grassy area.

The second sub-setting is not only a passing-through space, but also a place where sitting-resting, watching the passer byes, chatting on the benches are the primary activities at the same time. It is also possible to see students who usually sell or introduce other students to their politically propagandizing magazines, newspapers on the tables in this setting.

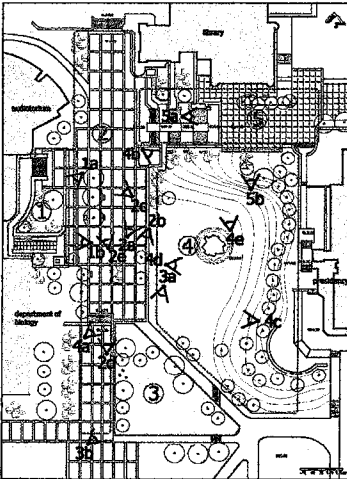
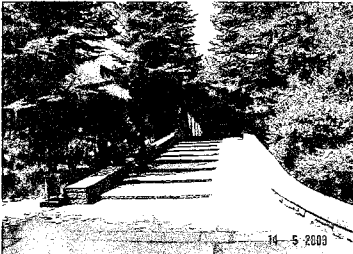
The third sub-setting is an ideal place for sitting-lying down-resting, chatting and, reading as it offers places on the grass area, which is quite and shaded. The fourth sub-setting has many quiet areas under shaded trees, which are suitable for studying-reading, listening to music; and it is quite convenient for students to gather in groups while chatting and having lunch when they get take-out food from the canteen on the Physics Building's ground floor.

On the slopey areas of sub-setting four, people sometimes watch performances, which were taken place on sub-setting five. Sub-setting four offers suitable places to students for socializing with each other, as well as intimacy and privacy. Sub-setting five is a paved platform where students sit and rest on the benches for short durations, and it is a convenient place for performances, which are sometimes arranged, since it has natural seating places on slopey areas of sub-setting four.

Briefly, sub-setting one, two and four were found having the highest behavioral densities. The behavioral density is especially quite high at the entry point to the Biology Department's Building and the Auditorium, that is, where there is a relationship between an indoor and outdoor space. In sub-setting two, locations of benches and ledges were used highly. The fourth sub-setting was used heavily at every location. The second highest density places were in sub-setting three. The lowest behavioral density was found in sub-setting five.



Table 4.11. Activity nodes in setting B: Diverse activities located in sub-settings.

|                                                                                                                                                              |  |  |                                                                                                                                              |                                                                                                                                             |                                                                                                                                              |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|
| <div><b>ACTIVITY NODES</b></div> <div></div> <div><b>in SETTING B</b></div> |  |  | <div></div> <div>1a sitting-resting under trees</div>       | <div></div> <div>1b sitting along the ledges</div>        |                                                                                                                                              |
|                                                                                                                                                              |  |  | <div></div> <div>2a sitting along the ledges</div>          | <div></div> <div>2b a sit-in protest</div>                |                                                                                                                                              |
|                                                                                                                                                              |  |  | <div></div> <div>2c selling-buying newspapers</div>        | <div></div> <div>2d passer byes through the setting</div> | <div></div> <div>2e sitting-chatting on the benches</div> |
|                                                                                                                                                              |  |  | <div></div> <div>3a sitting-resting in shaded space</div> | <div></div> <div>3b sitting-chatting on the lawns</div>  | <div></div> <div>4a resting around the monument</div>    |
|                                                                                                                                                              |  |  | <div></div> <div>4b lying down on grassy slope</div>      | <div></div> <div>4c resting in groups on lawns</div>     | <div></div> <div>4d taking a graduation photograph</div> |
|                                                                                                                                                              |  |  | <div></div> <div>4e watching a performance</div>          | <div></div> <div>5a a Japanese drum performance</div>    | <div></div> <div>5b a Japanese drum performance</div>    |



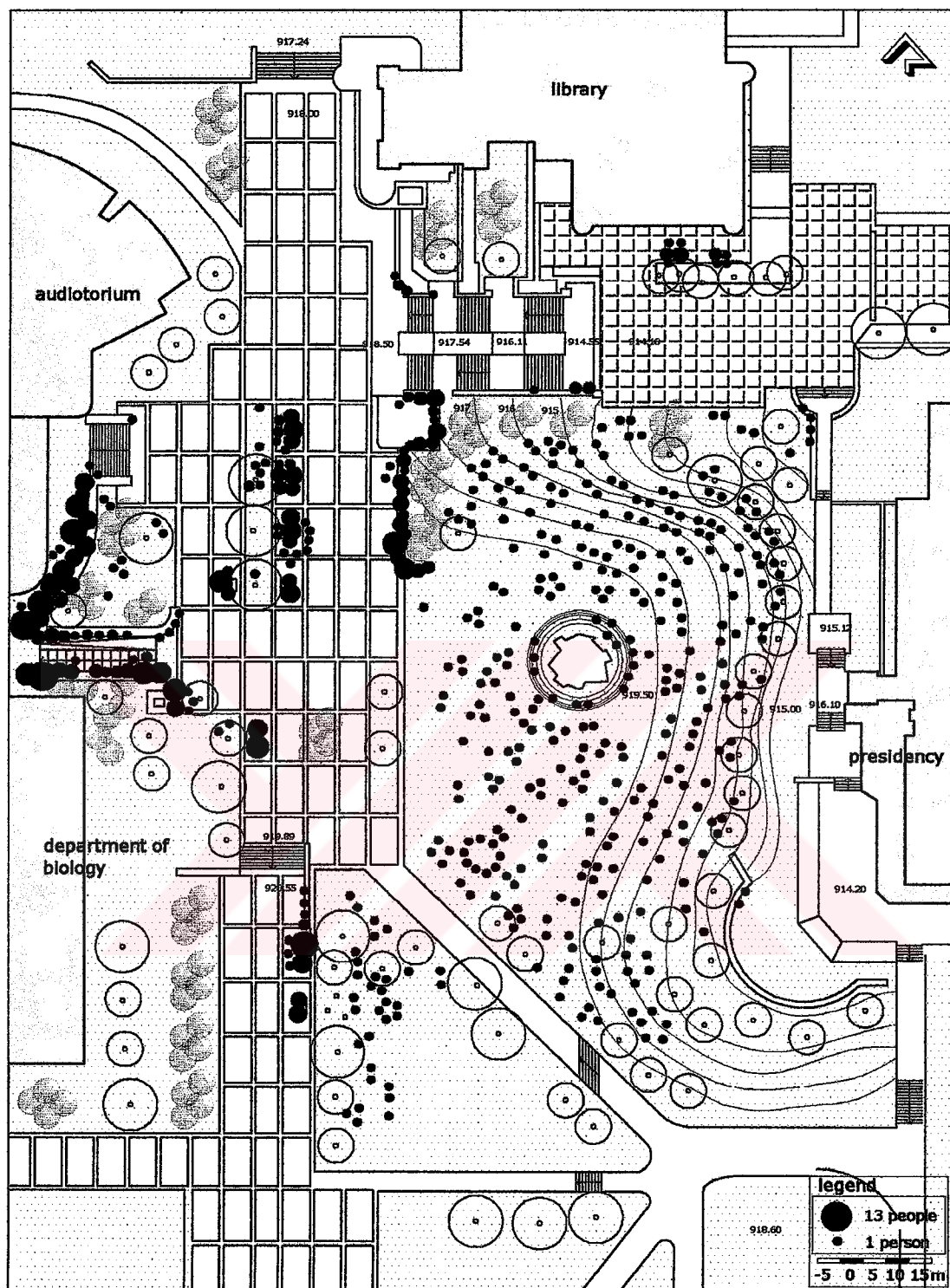


Figure 4.10. Behavioral mapping of setting B, which shows the location of people\*.

\* Circle size corresponds to the behavioral density in specific locations. Data was based on the total number of people observed during the time intervals, which was from 12.10 a.m. to 1.10 p.m. including five weekdays.

4.5.3. Findings of Questionnaires

In the analysis of the first part of the questionnaires, five people of the total respondents (n=69) indicated that they do not use this setting by themselves, they only engaged in group activities. However, none of the respondents specified that they do not use this setting in groups.

Analysis of the activities conducted alone by the users in this setting indicated that the most frequent activities were, in order, studying-reading (54.7%), sitting-resting (53.1%) and waiting (45.3%). Other activities conducted alone, which were eating-drinking (37.5%), playing guitar-listening to music (37.5%), lying down on lawns-sleeping (17.2%), are of second-degree importance. Having a frequency of less than 10% of cases and of less importance are the activities of having a break-spending time and sports activities which have been combined under the heading of other activities (Table 4.12).

Table 4.12. Activities conducted alone in setting B.

| Activities conducted alone        | response* | % of responses | % of cases |
|-----------------------------------|-----------|----------------|------------|
| Studying-reading                  | 35        | 22%            | 54.7%      |
| Sitting-resting                   | 34        | 21.4%          | 53.1%      |
| Waiting                           | 29        | 18.2%          | 45.3%      |
| Eating-drinking                   | 24        | 15.1%          | 37.5%      |
| Playing guitar-listening to music | 24        | 15.1%          | 37.5%      |
| Lying down on lawns-sleeping      | 11        | 6.9%           | 17.2%      |
| Other activities                  | 2         | 1.3%           | 3.2%       |
| Total                             | 159       | 100%           | 248.5%**   |

\* 5 missing cases, 64 valid cases

\*\* Respondents could specify more than one activity; therefore the total does not add up to 100 percent.

Users were asked how many times they were engaged in these activities per week. They specified that they were engaged in studying-reading three times (mean: 3.33), sitting-resting at an average seven times (mean: 6.75), waiting six times (mean: 6.41), eating-drinking four times (mean: 4.16), playing guitar-listening to music nearly four times (mean: 4.09), and lying down on lawns-sleeping nearly four times (mean: 4.00) per week (Table 4.13). The activity type that users engaged in most, which was studying-reading has the lowest frequency among all other activity types.

Table 4.13. Frequency of major activity types conducted alone in setting B.

| Frequency of activities conducted alone | min. | max.  | mean | SD   |
|-----------------------------------------|------|-------|------|------|
| Studying-reading                        | 0.25 | 10.00 | 3.33 | 2.66 |
| Sitting-resting                         | 1.00 | 25.00 | 6.75 | 4.74 |
| Waiting                                 | 1.00 | 20.00 | 6.41 | 4.97 |
| Eating-drinking                         | 1.00 | 15.00 | 4.16 | 3.04 |
| Playing guitar-listening to music       | 0.50 | 25.00 | 4.09 | 5.54 |
| Lying down on lawns-sleeping            | 1.00 | 10.00 | 4.00 | 2.68 |

Chatting (89.9%), eating-drinking (50.7%), studying-reading (27.5%), sitting-resting (20.3%), games and sports activities (13%) are the most frequent ones among the group activities (Table 4.14).

On the other hand, other activities conducted in groups like waiting, playing an instrument-listening to music, selling or buying tickets-magazines-pamphlets, lying down on lawns-sleeping, meeting, student clubs' activities, and having a break-spending time, have less than the frequency of 10% of cases, therefore they were combined as other activities in Table 4.14.

Table 4.14. Activities conducted in groups in setting B.

| Activities conducted in groups | response | % of responses | % of cases |
|--------------------------------|----------|----------------|------------|
| Chatting                       | 62       | 36.1%          | 89.9%      |
| Eating-drinking                | 35       | 20.3%          | 50.7%      |
| Studying-reading               | 19       | 11.1%          | 27.5%      |
| Sitting-resting                | 14       | 8.1%           | 20.3%      |
| Games                          | 9        | 5.2%           | 13.0%      |
| Sports activities              | 9        | 5.2%           | 13.0%      |
| Other activities               | 24       | 14%            | 34.6%      |
| Total                          | 172      | 100%           | 249%*      |

\* 69 valid cases, no missing cases

\* Respondents could specify more than one activity; therefore the total does not add up to 100 percent.

Indicating the level of activity diversity, there are six major different types of activities that occurred in setting B both by individual and group users; they are studying-reading, sitting-resting, waiting, eating-drinking, playing guitar-listening to music and chatting, as shown in Table 4.12 and 4.14.

Concerning frequency of activities conducted in groups, users specified that they were engaged in chatting nearly six times (mean:6.28), eating-drinking four times (mean: 3.96), studying-reading two times (mean: 1.97), sitting-resting five times (mean:5.08), games nearly four times (mean: 3.50) and sports activities twice (mean:2.44) per week (Table 4.15). Chatting as the activity type that many users (89.9%) mentioned (Table 4.12) is the most frequent activity among all other activity type like in setting A.

Table 4.15. Frequency of major activity types conducted in groups in setting B.

| Frequency of activities conducted in groups | min. | max.  | mean | SD   |
|---------------------------------------------|------|-------|------|------|
| Chatting                                    | 0.50 | 25.00 | 6.28 | 4.52 |
| Eating-drinking                             | 1.00 | 10.00 | 3.96 | 2.21 |
| Studying-reading                            | 0.50 | 5.00  | 1.97 | 1.35 |
| Sitting-resting                             | 1.00 | 10.00 | 5.08 | 3.26 |
| Games                                       | 1.00 | 10.00 | 3.50 | 3.11 |
| Sports activities                           | 1.00 | 5.00  | 2.44 | 1.94 |

Respondents were also asked to indicate a specific place for each activity that they engaged in setting B. The average place preferences for sub-setting B4 was 87.5% in individual use, 86.8% in group use; for sub-setting B1 is 37.5% in individual use and 22.1% in group use; for sub-setting B2 is 15.6% in individual use, 13.2% in group use.

Sub-setting B3 is underused with the preferences of 3.1% in individual use, 4.4% in group use. Users did not mention sub-setting B5, since it was preferred usually for performances, neither for individual nor group use. Similarly, it is also possible to see in the behavioral mapping that it is underused (Table 4.16).

Table 4.16. The preference ratios of sub-settings shows use density of each sub-setting in setting B.

| Preference ratios of sub-settings<br>for all kinds of activities | individual users |            | group users |            |
|------------------------------------------------------------------|------------------|------------|-------------|------------|
|                                                                  | response*        | percentage | response**  | percentage |
| Sub-setting B4                                                   | 56               | 87.5%      | 59          | 86.8%      |
| Sub-setting B1                                                   | 24               | 37.5%      | 15          | 22.1%      |
| Sub-setting B2                                                   | 10               | 15.6%      | 9           | 13.2%      |
| Sub-setting B3                                                   | 2                | 3.1%       | 3           | 4.4%       |
| Total                                                            | 92               | 143.7%***  | 86          | 126.5%***  |

\* 5 missing cases, 64 valid cases

\*\* 1 missing case, 68 valid cases

\*\*\*Users could specify different specific places in one sub-setting for different activities; therefore the total does not end up to 100 percent.

It is worth noting here that many of the users preferred sub-setting B4 as their first choice for studying-reading, sitting-resting, eating-drinking, playing guitar-listening to music, lying down on lawns-sleeping, chatting, games and sports activities (Table 4.17). This implies that sub-setting B4 is *“the most diversified sub-setting”* among all other sub-settings, since it has a potential to respond to many different types of activities. For waiting, sub-setting one was dominantly preferred since it is very close to departments. For sports activities, sub-setting two was preferred due to the hard pavement.

The average group size was four people (mean 4.00) in setting B. Students meet with their friends seven times per week (mean: 7.34), whereas the number of visits made by people alone per week was eight (mean: 8.42). The duration of the each visit is on average 55.96 minutes in group use, 36.08 minutes in individual use and the total occupancy time in group use is 397.32 minutes (~6 hours) per week, while this duration is 280.65 minutes (~4 hours) in individual use per week. Students spent approximately two hours more in this setting when they were in pairs or groups (Table 4.18).

Table 4.17. A match between activities conducted alone and in groups and sub-settings showing sub-setting preferences for each activity type.

| ACTIVITIES                                         | SUB-SETTINGS |       |       |       |       |
|----------------------------------------------------|--------------|-------|-------|-------|-------|
|                                                    | B1           | B2    | B3    | B4    | TOTAL |
| Studying-reading (by individuals)                  | 11.4%        | 5.7%  | 2.9%  | 80.0% | 100%  |
| Studying-reading (by groups)                       | 5.3%         |       | 5.3%  | 89.5% | 100%  |
| Sitting-resting (by individuals)                   | 11.8%        |       | 5.9%  | 82.4% | 100%  |
| Sitting-resting (by groups)                        | 7.1%         |       |       | 92.9% | 100%  |
| Waiting (by individuals)                           | 48.3%        | 27.6% |       | 24.1% | 100%  |
| Eating-drinking (by individuals)                   | 16.7%        | 8.3%  | 2.9%  | 75.0% | 100%  |
| Eating-drinking (by groups)                        | 25.7%        | 8.6%  |       | 62.9% | 100%  |
| Playing guitar-listening to music (by individuals) | 21.7%        | 4.3%  |       | 73.9% | 100%  |
| Lying down on lawns-sleeping (by individuals)      |              |       |       | 100%  | 100%  |
| Chatting (by groups)                               | 14.8%        | 1.6%  | 1.6%  | 82%   | 100%  |
| Games (by groups)                                  | 22.2%        |       | 11.1% | 66.7% | 100%  |
| Sports activities (by groups)                      |              | 50.0% |       | 50.0% | 100%  |

Table 4.18. Occupancy time of users in setting B.

| Occupancy time                    | individual users |        |        | group users |        |        |
|-----------------------------------|------------------|--------|--------|-------------|--------|--------|
|                                   | response         | mean   | SD     | response    | mean   | SD     |
| Number of average visits per week | 60               | 8.42   | 5.17   | 64          | 7.34   | 4.15   |
| Occupancy time of each visit      | 61               | 36.08  | 22.98  | 64          | 55.96  | 40.50  |
| Total occupancy time per week     | 61               | 280.65 | 257.52 | 64          | 397.32 | 315.13 |

The major finding about the responses to semantic differential scales implied positive associations with setting B, indicating the perceived image and the meaning of this setting kept by users. It was observed that responses almost overlapped with common selections on positive adjectives such as attractive, inviting, comfortable, beautiful, relaxed and unique. However, responses have more positive values when compared to setting A. Mean values of responses between the male and female groups to semantic scales yielded only subtle differences indicating female group's preferences are on the much more positive side than the male group (Figure 4.11).

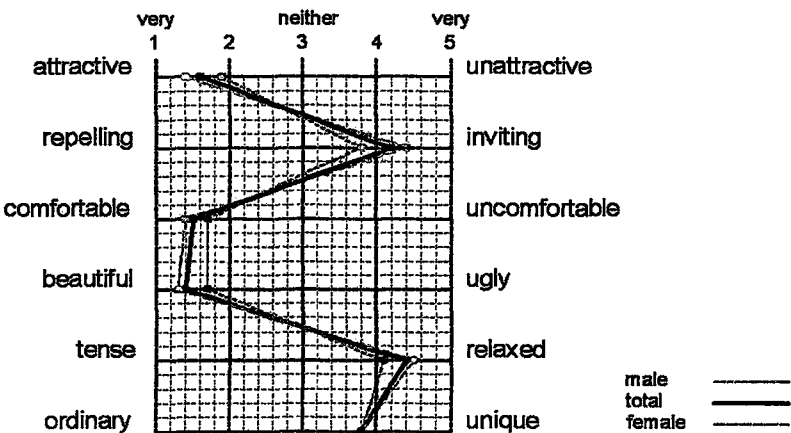


Figure 4.11. Adjective scale rating measuring the meaning of setting B held by users.



Overall, this data for setting B proved that there is a consistency between the results of observations and the questionnaires. Specifically, the behavioral density of the sub-settings that can be seen from behavioral mapping is totally consistent with the place preference results of the questionnaires.

When the group use and individual use were compared, it was found that waiting in individual use was seen as different from group activities, chatting was noticed as different from individual activities in terms of activity types. On the other hand, group users stay in setting B much more than individual users in terms of occupancy time.

## **4.6. Analysis of Setting C**

### **4.6.1. Descriptive Analysis**

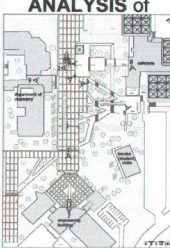
**Location and Context:** The outdoor campus space surrounded by the Cafeteria, the Department of Chemistry, and the Engineering Building was selected as the third case study setting. This third setting (setting C) is subsequent of the second setting (setting B) on the pedestrian alley. According to the information obtained from the initial observations, it is a relatively well-used outdoor space on the campus when we compare it with setting A and B. Being located almost in the middle of the pedestrian alley, it is again one of the central outdoor spaces on the whole campus at the same time (see Appendix G and H).

**User Identification:** It is possible to see a wide range of student activities in this space. Due to the student's club rooms in Baraka and the Cafeteria, students from almost all of the departments use this space. The users of this setting are generally students who are between the ages of 18-21 and also the workers of the cafeteria who are older adults.

**Spatial and Physical Attributes:** Table 4.19 indicates the analysis of this setting with successful and unsuccessful features and specific elements like enclosing façades, entrances-front yards, focal points-sculptures, transition spaces and aerial views.

The setting C is connected by a wide staircase to the setting B on the pedestrian alley. It is surrounded on four sides by buildings: on the west by the Department of Chemistry Building, on the east by the Cafeteria and Baraka (student's clubs rooms), and on the south by the Engineering Building. The space has both landscaped and paved parts at different levels.

Table 4.19. Analysis of setting C with its physical features.

|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                               |                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>ANALYSIS of</b></p>  <p><b>SETTING C</b></p>                                                                                                                                                                                                                                                                                                                                                 |  <p>1</p>    |  <p>2</p>    |  <p>3</p>                                                                                                                                                                                                                                                                                                                                                                                                                      |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  <p>4</p>    |  <p>5</p>    | <p><b>FACADES</b></p> <ul style="list-style-type: none"> <li>Successful Features <ul style="list-style-type: none"> <li>Busts visually enhance the space</li> <li>Greenery is sufficiently rich</li> <li>Adjacent to one of the high activity building on the campus, that is the Cafeteria</li> </ul> </li> <li>Visible and accessible from many directions</li> <li>The only high-rised building on the whole campus, which is the MM building, which surrounds this setting as a kind of landmark</li> </ul> |
| <p><b>Unsuccessful Features</b></p> <ul style="list-style-type: none"> <li>No water fountain</li> <li>Bench design is very poor and not comfortable, since they have no back</li> <li>Paving is uneven, making walking difficult.</li> <li>No bike pathway</li> <li>No flowers to enrich the colors of the setting.</li> <li>The size of the setting is quite large to be able to perceive</li> <li>Not enough seating</li> <li>No eye-catching feature like a sculpture</li> </ul> |  <p>7</p>    |  <p>8</p>    | <p><b>ENTRANCES-FRONT YARDS</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |  <p>10</p>   |  <p>9</p>    | <p><b>FOCAL POINT-SCULPTURE</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| <p><b>SILHOUETTES</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                           |  <p>11</p> |  <p>12</p> | <p><b>AERIAL VIEW</b></p> <ul style="list-style-type: none"> <li>Variety of green and hard-surfaced sub-settings</li> <li>Attracts students from different departments to the outdoor place adjacent to the student's club rooms in Baraka</li> <li>Many entry points at different levels</li> <li>Visual cues indicate the front yards of the surrounding buildings successfully</li> <li>Steps are convenient for sitting</li> <li>Close food sources</li> </ul>                                              |

The whole setting was examined under six sub-settings (Table 4.20). The first sub-setting is the circulation area along the main setting including the front yard of the Department of Chemistry Building, which enables casual sitting on the wide steps. There is also a small canteen that serves a limited selection of food on the ground floor of the Department of Chemistry Building. The second sub-setting includes two different entries to the Cafeteria at different levels.

The first sub-setting was connected to the second one's lower level with tunnel-like bushy pedestrian way. The third sub-setting is the open grassy area with many shaded trees around the Baraka. The fourth sub-setting is the front yard of the Engineering Building, which is a paved platform at just one level including a water fountain that was poorly maintained. Sub-setting five and six are the grassy areas under the shaded trees. There are also some statues that make the setting visually enriching, but no eye-catching feature as a focal point along the entire setting.

#### **4.6.2. Findings of Observations**

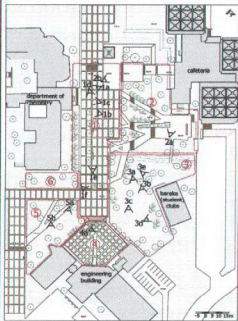
The total number of users, who were observed through five weekdays, was 735 people, of which 209 were female and 526 male. The area is about  $10.735 \text{ m}^2$  and the number of people per  $\text{m}^2$  is  $735/10.735 = 0.068$ . The behavioral density for this setting is about  $10.735/735 = 14.60$ . Representing the total composite of this data, the behavioral map (Figure 4.12) illustrates the behavioral densities and their locations.

Including the front yard of the department of Chemistry and a row of trees and benches, the primary activities are waiting, meeting, eating and chatting in the first sub-setting. For instance, since this setting is very close to the canteen on the ground floor of department of Chemistry, students usually eat their lunches or have a drink while they are sitting on the front yard steps and chatting at the same time.

On the other hand, the second sub-setting's major activity types are waiting and meeting before lunch, since it consists of the front yards of the Cafeteria. Especially the front yard of the Cafeteria on the lower level is usually overcrowded during lunch hours. Students sometimes form long lines while waiting for their turn to enter into the Cafeteria and generally wait for their friends in order to have lunch together. The third sub-setting has the places where students lie down, chat, read a newspaper after the lunch hour, play football, play guitar and listen to it in groups. Students especially get together in front of Baraka and they talk about their club activities.



Table 4.20. Activity nodes in setting C: Diverse activities located in sub-settings.

|                                                                                                                                           |                                                                                                                                 |                                                                                                                                  |
|-------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| <p><b>ACTIVITY NODES</b></p>  <p><b>in SETTING C</b></p> |  <p>1a density after the class</p>             |  <p>1b sitting-resting on the steps</p>         |
|                                                                                                                                           |  <p>1c sitting-chatting on the steps</p>       |  <p>1d sitting under trees</p>                  |
|  <p>1e sitting-watching on the benches</p>               |  <p>1f passer byes through the setting</p>     |  <p>2a meeting at the front yard of the Cf.</p> |
|  <p>2b upper entrance to the cafeteria</p>               |  <p>3a playing and listening to the guitar</p> |  <p>3b playing football on the grassy area</p>  |
|  <p>3c meeting with friends</p>                        |  <p>3d sitting at Baraka's shaded places</p> |  <p>3e meeting in front of Baraka</p>         |
|  <p>4a having a cigarette break</p>                    |  <p>5a sitting under a tree</p>              |  <p>5b sitting-chatting in a shaded space</p> |

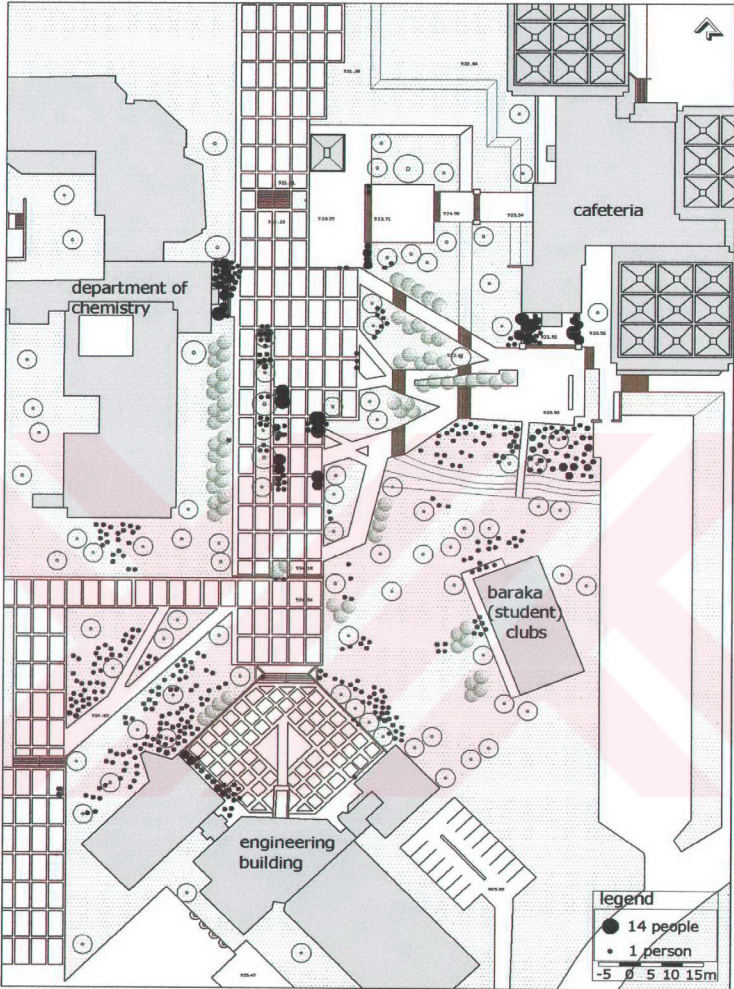


Figure 4.12. Behavioral mapping of setting C, which shows the location of people\*.

\* Circle size corresponds to the behavioral density in specific locations. Data was based on total number of people observed during the time intervals, which was from 12.10 a.m. to 1.10 p.m. including five weekdays.

Waiting, eating and sometimes chatting for short durations while sitting and resting at the same time on the ledges in sub-setting four were observed. The fifth sub-



setting is an ideal place for sitting, lying down, resting, chatting and reading-studying as it offers places on the grass area which is quiet and shaded. Sub-setting six is similar to sub-setting five with its physical qualities, and thus the activity types which were observed are the same, but it has a lower use density than sub-setting five.

Briefly, sub-setting one, three and five were found to have the highest behavioral densities. The behavioral density is quite high especially at the entry point to Chemistry Department's Building, that is, where there is a relationship between an indoor and outdoor space. The highest behavioral density was found in sub-setting two and four. Sub-setting six had the lowest behavioral density as it appears in behavioral mapping.

### 4.6.3. Findings of Questionnaires

In the analysis of the first part of the questionnaires, four people of the total respondents (n=70) indicated that they do not use this setting by themselves, they only engaged in group activities. On the other hand, six people of the total respondents (n=70) specified that they do not use this setting in groups, they only engaged in activities conducted alone. This means that sixty people of the respondents, uses this space both individually and in groups.

Analysis of the activities conducted alone by the users in this setting indicated that the most frequent activities were, in order, sitting-resting (60.6%), studying-reading (31.8%) and eating-drinking (21.2%). Other activities conducted alone, which were waiting (13.6%), and lying down on lawns-sleeping (13.6%), are of second degree importance. Having a frequency of less than 10% of cases and of less importance are the activities of watching people-around, playing guitar-listening to music, smoking and students' club activities have been combined under the heading of other activities (Table 4.21).

Table 4.21. Activities conducted alone in setting C.

| Activities conducted alone   | response   | % of responses | % of cases*     |
|------------------------------|------------|----------------|-----------------|
| Sitting-resting              | 40         | 37.4%          | 60.6%           |
| Studying-reading             | 21         | 19.6%          | 31.8%           |
| Eating-drinking              | 14         | 13.1%          | 21.2%           |
| Waiting                      | 9          | 8.4%           | 13.6%           |
| Lying down on lawns-sleeping | 9          | 8.4%           | 13.6%           |
| Other activities             | 14         | 13.1%          | 21.3%           |
| <b>Total</b>                 | <b>107</b> | <b>100%</b>    | <b>162.1%**</b> |

\* 4 missing cases, 66 valid cases

\*\* Respondents could specify more than one activity; therefore the total does not add up to 100 percent.

As to frequency of the activities above, they specified that they were engaged in sitting-resting at an average six times (mean: 6.86), studying-reading three times (mean: 3.38), eating-drinking nearly six times (mean: 5.64), waiting nearly four times (mean: 3.77), and lying down on lawns-sleeping nearly six times (mean: 5.75) per week (Table 4.22). According to this data, the activity type that users engaged in most, which was sitting-resting, has also the highest frequency among all other activity types.

Table 4.22. Frequency of major activity types conducted alone in setting C.

| Frequency of activities conducted alone | min. | max.  | mean | SD   |
|-----------------------------------------|------|-------|------|------|
| Sitting-resting                         | 1.00 | 20.00 | 6.86 | 4.27 |
| Studying-reading                        | 1.00 | 10.00 | 3.38 | 2.29 |
| Eating-drinking                         | 1.00 | 10.00 | 5.64 | 3.22 |
| Waiting                                 | 1.00 | 5.00  | 3.77 | 1.64 |
| Lying down on lawns-sleeping            | 1.00 | 10.00 | 5.75 | 2.96 |

Analysis of group activities presented that chatting (75%), sitting-resting (20.3%), eating-drinking (18.8%), studying-reading (10.9%), games (10.9%) were the most frequent activity types among all the others. On the other hand, having a frequency of less than 10% of cases and of less importance are the activities of students' club activities, sports activities, meeting, playing guitar-listening to music, smoking, waiting, having a break-spending time, lying down on lawns-sleeping and watching people-around have been combined under the heading of other activities (Table 4.23).

Table 4.23. Activities conducted in groups in setting C.

| Activities conducted in groups | response   | % of responses | % of cases*     |
|--------------------------------|------------|----------------|-----------------|
| Chatting                       | 48         | 43.3%          | 75.0%           |
| Sitting-resting                | 13         | 11.7%          | 20.3%           |
| Eating-drinking                | 12         | 10.8%          | 18.8%           |
| Studying-reading               | 7          | 6.3%           | 10.9%           |
| Games                          | 7          | 6.3%           | 10.9%           |
| Other activities               | 24         | 21.6%          | 37.5%           |
| <b>Total</b>                   | <b>111</b> | <b>100%</b>    | <b>173.4%**</b> |

\* 6 missing cases, 64 valid cases

\*\* Respondents could specify more than one activity; therefore the total does not add up to 100 percent.

Representing the level of activity diversity, there are four major kinds of activities that occurred in setting C both by individual and group users, that is, sitting-resting, studying-reading, eating-drinking and chatting as shown in Table 4.21 and 4.23.

When users have been asked to specify how many times per week they were engaged in these activities, they stated chatting six times (mean:6.37), sitting-resting seven times (mean:7.25), eating-drinking six times (mean: 6.00), studying-reading

three times (mean: 3.33), and games four times (mean: 4.46) per week (Table 4.24). Two activity types that users engaged in most, that is, chatting and sitting-resting, has the highest frequency as well.

Table 4.24. Frequency of major activity types conducted in groups in setting C.

| Frequency of activities conducted in groups | min. | max.  | mean | SD   |
|---------------------------------------------|------|-------|------|------|
| Chatting                                    | 1.00 | 20.00 | 6.37 | 3.34 |
| Sitting-resting                             | 2.00 | 20.00 | 7.25 | 4.75 |
| Eating-drinking                             | 1.00 | 10.00 | 6.00 | 2.82 |
| Studying-reading                            | 1.00 | 5.00  | 3.33 | 1.86 |
| Games                                       | 0.25 | 10.00 | 4.46 | 3.20 |

Respondents were also asked to indicate a specific place for each activity that they engaged in in setting C. The average place preferences for sub-setting C1 is 43.9% in individual use, 28.1% in group use; for sub-setting C2 is 27.3% in individual use and 29.7% in group use; for sub-setting C3 is 18.2% in individual use, 18.8% in group use, for sub-setting C5 is 15.2% in individual use and 29.7% in group use, for sub-setting C4 is 7.6% in individual use, 4.7% in group use, and sub-setting C6 was not mentioned by any of the respondents (Table 4.25). According to this data, while sub-setting C1 is the most preferred place, sub-setting C4 and C6 are underused as it also appears in behavioral mapping.

Table 4.25. The preference ratios of sub-settings shows use density of each sub-setting in setting C.

| Preference ratios of sub-settings for all kinds of activities | individual users |                  | group users |                |
|---------------------------------------------------------------|------------------|------------------|-------------|----------------|
|                                                               | response*        | percentage       | response**  | percentage     |
| Sub-setting C1                                                | 29               | 43.9%            | 18          | 28.1%          |
| Sub-setting C2                                                | 18               | 27.3%            | 19          | 29.7%          |
| Sub-setting C3                                                | 12               | 18.2%            | 12          | 18.8%          |
| Sub-setting C5                                                | 10               | 15.2%            | 19          | 29.7%          |
| Sub-setting C4                                                | 5                | 7.6%             | 3           | 4.7%           |
| <b>Total</b>                                                  | <b>74</b>        | <b>112.1%***</b> | <b>71</b>   | <b>111%***</b> |

\* 4 missing cases, 66 valid cases

\*\* 6 missing cases, 64 valid cases

\*\*\*Users could specify different specific places in one sub-setting for different activities; therefore the total does not end up to 100 percent.

When activities and sub-settings were matched, it was found that many of the users preferred sub-setting C1 as their first choice for sitting-resting, studying-reading (by groups), eating-drinking and chatting (Table 4.26).

This implies that sub-setting C1 is *"the most diversified sub-setting"* among all other sub-settings, since it has a potential to respond to many different types of activities. For the waiting and lying down lawns-sleeping, sub-setting two was dominantly preferred since it has a front yard of a cafeteria and a slopey grass area. For games,



sub-setting five was preferred due to its convenience for gathering in groups under shaded trees.

Table 4.26. A match between activities both conducted alone and in groups and sub-settings showing sub-setting preferences for each activity type.

| ACTIVITIES                                  | SUB-SETTINGS |       |       |       |       | TOTAL |
|---------------------------------------------|--------------|-------|-------|-------|-------|-------|
|                                             | C1           | C2    | C3    | C4    | C5    |       |
| Sitting-resting (by individuals)            | 50.0%        | 22.5% | 20.0% | 2.5%  | 5.0%  | 100%  |
| Sitting-resting (by groups)                 | 30.8%        | 23.1% | 15.4% |       | 30.8% | 100%  |
| Studying-reading (by individuals)           | 19.0%        | 23.8% | 23.8% | 4.8%  | 28.6% | 100%  |
| Studying-reading (by groups)                | 71.4%        | 14.3% |       |       | 14.3% | 100%  |
| Eating-drinking (by individuals)            | 50.0%        | 8.3%  | 21.4% | 14.3% | 14.3% | 100%  |
| Eating-drinking (by groups)                 | 33.3%        |       | 16.7% | 16.7% | 25.0% | 100%  |
| Waiting (by individuals)                    | 33.3%        | 55.6% | 11.0% |       |       | 100%  |
| Lying down on lawns-sleeping(by individual) | 11.1%        | 44.4% | 22.2% |       | 22.2% | 100%  |
| Chatting (by groups)                        | 29.2%        | 27.1% | 14.6% | 2.1%  | 27.1% | 100%  |
| Games (by groups)                           |              |       | 28.6% |       | 71.4% | 100%  |

Average group size is nearly four people (mean:3.95) in setting C. Students meet their friends seven times per week (mean: 7.09), whereas the number of visits made by people alone per week is nearly thirteen (mean: 12.50). The duration of each visit is on average 32.95 minutes in group use, 25.76 minutes in individual use, and the total occupancy time in group use is 253.90 minutes (~four hours) per week, while this duration is 221.05 minutes (three and a half hours) in individual use per week. Based on this data, students spent approximately equal time in this setting when they were alone and in pairs or groups (Table 4.27).

Table 4.27. Occupancy time of users in setting C.

| Occupancy time                   | individual users |        |        | group users |        |        |
|----------------------------------|------------------|--------|--------|-------------|--------|--------|
|                                  | response         | mean   | SD     | response    | mean   | SD     |
| Number of average visit per week | 62               | 12.50  | 12.15  | 64          | 7.09   | 7.02   |
| Occupancy time of each visit     | 64               | 25.76  | 16.93  | 62          | 32.95  | 22.340 |
| Total occupancy time per week    | 64               | 221.05 | 246.83 | 62          | 253.90 | 281.15 |

The analysis of the semantic differential scale shows that users have positive associations with setting C, except for the responses about ordinary/ unique, which stays at neither unique nor ordinary. Other responses almost overlapped with the common selections on positive adjectives such as attractive, inviting, comfortable, beautiful and relaxed. Mean values of responses between the male and the female groups to semantic scales yielded only subtle differences indicating that the female group's responses have higher positive mean values than the male group regarding inviting, comfortable, beautiful and relaxed. On the other hand, male group found this setting more attractive than female group (Figure 4.13).

Briefly, this data for setting C proved that there is a general consistency between the results of observations and the questionnaires like in setting A and B. Specifically, the behavioral density of these sub-settings that can be seen from behavioral mapping is consistent with the place preference results of the questionnaires.

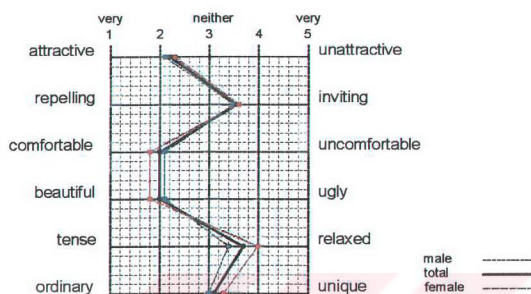


Figure 4.13. Adjective scale rating measuring the meaning of setting C held by users.

When the group use and individual use were compared for this setting, it was found that waiting and lying down on lawns-sleeping in individual use were seen as different from group activities, chatting and games were noticed as different from individual activities in terms of activity types. On the other hand, there is not much difference between the occupancy time of group users and individual users.

#### 4.7. Qualitative Analysis Procedure for Whole Sample

Table 4.28 presents the percentages for the different activities that take place in these three settings by individual users for the whole sample. According to this data, the activities that users mostly engaged in, sitting-resting (55.1%), studying-reading (43.4%), waiting (34.2%), eating-drinking (27.0%), playing guitar-listening to music (18.9%) and lying down on lawns-sleeping (11.2%). Other activities includes smoking, having a break-spending time, watching people-around, selling-buying tickets, magazines, pamphlets, students' club activities, sports activities.

Respondents also specified the frequency of the individual activities above. Data in Table 4.29 shows that individual users engage in sitting-resting at an average six times (mean: 6.56), studying-reading three times (mean: 3.54), waiting nearly five times (mean: 4.83), eating-drinking nearly four times (mean: 4.57), playing guitar-



listening to music four times (mean: 4.13), and lying down on lawns-sleeping nearly four times (mean: 4.57) per week (Table 4.29). According to this data, the activity type that users engaged in most, which is sitting-resting, has also the highest frequency among all other activity types. Even though studying-reading is the second in importance of engaged activities, it is the least frequented activity type.

Table 4.28: Activities conducted alone in whole selected settings.

| Activities conducted alone        | response   | % of responses | % of cases*     |
|-----------------------------------|------------|----------------|-----------------|
| Sitting-resting                   | 108        | 26.4%          | 55.1%           |
| Studying-reading                  | 85         | 20.8%          | 43.4%           |
| Waiting                           | 67         | 16.4%          | 34.2%           |
| Eating-drinking                   | 53         | 13.0%          | 27.0%           |
| Playing guitar-listening to music | 37         | 9.0%           | 18.9%           |
| Lying down on lawns-sleeping      | 22         | 5.4%           | 11.2%           |
| Other activities                  | 37         | 9.0%           | 18.9%           |
| <b>Total</b>                      | <b>409</b> | <b>100%</b>    | <b>208.7%**</b> |

\* 13 missing cases, 196 valid cases

\*\* Respondents could specify more than one activity; therefore the total does not add up to 100 percent.

Table 4.29. Frequency of major activity types conducted alone in whole selected settings.

| Frequency of activities conducted alone | min. | max.  | mean | SD   |
|-----------------------------------------|------|-------|------|------|
| Sitting-resting                         | 1.00 | 25.00 | 6.56 | 4.89 |
| Studying-reading                        | 0.25 | 15.00 | 3.54 | 2.80 |
| Waiting                                 | 1.00 | 20.00 | 4.83 | 3.95 |
| Eating-drinking                         | 0.50 | 15.00 | 4.57 | 3.06 |
| Playing guitar-listening to music       | 0.50 | 25.00 | 4.13 | 4.75 |
| Lying down on lawns-sleeping            | 1.00 | 10.00 | 4.57 | 2.83 |

Considering group activities, users mostly engaged in, in order, chatting (82.7%), eating-drinking (33.2), studying-reading (21.3%), sitting-resting (18.8%), sports activities (12.9%), meeting (11.4%) and games (10.9%). Other activities include playing guitar-listening to music, students' club activities, selling-buying tickets, magazines, pamphlets, waiting, lying down on lawns-sleeping, smoking, watching people-around, having a break-spending time in group activities (Table 4.30).

Table 4.30. Activities conducted in groups in whole selected settings.

| Activities conducted in groups | response   | % of responses | % of cases*     |
|--------------------------------|------------|----------------|-----------------|
| Chatting                       | 167        | 38.2%          | 82.7%           |
| Eating-drinking                | 67         | 15.3%          | 33.2%           |
| Studying-reading               | 43         | 9.8%           | 21.3%           |
| Sitting-resting                | 38         | 8.7%           | 18.8%           |
| Sports activities              | 26         | 6.0%           | 12.9%           |
| Meeting                        | 23         | 5.3%           | 11.4%           |
| Games                          | 22         | 5.0%           | 10.9%           |
| Other activities               | 51         | 11.7%          | 25.2%           |
| <b>Total</b>                   | <b>437</b> | <b>100%</b>    | <b>216.4%**</b> |

\* 7 missing cases, 202 valid cases

\*\* Respondents could specify more than one activity; therefore the total does not add up to 100 percent.

As to frequency of the activities above, they specified that they were engaged in chatting at an average six times (mean: 6.73), eating-drinking four times (mean: 4.52), studying-reading nearly three times (mean:2.98), sitting-resting five times (mean:5.82), sports activities three times (mean: 3.30), meeting five times (mean: 5.79) and games three times (mean: 3.14) per week (Table 4.31). According to this data, the activity type that users engaged in most, which is chatting, has also the highest frequency among all other activity types. On the other hand, the least frequented activity is studying-reading as it is clear in Table 4.31.

Table 4.31. Frequency of major activity types conducted in groups in whole selected settings.

| Frequency of activities conducted in groups | min. | max.  | mean | SD   |
|---------------------------------------------|------|-------|------|------|
| Chatting                                    | 0.50 | 35.00 | 6.73 | 5.43 |
| Eating-drinking                             | 1.00 | 10.00 | 4.52 | 2.62 |
| Studying-reading                            | 0.50 | 10.00 | 2.98 | 2.35 |
| Sitting-resting                             | 1.00 | 20.00 | 5.82 | 4.55 |
| Sports activities                           | 0.05 | 10.00 | 3.30 | 3.17 |
| Meeting                                     | 1.00 | 20.00 | 5.79 | 4.86 |
| Games                                       | 0.25 | 10.00 | 3.14 | 2.91 |

The average group size was nearly four people (mean: 4.03) in whole selected settings. People visited these settings ten times per week when they were alone, and seven times per week when they were in groups. Each visit's duration is half an hour for individual users and for group users ten minutes more, namely forty minutes. Total occupancy time per week for all settings, on average, is four and a half hours when they were by themselves; and five and a half hours when they were with their friends (Table 4.32). This implies that students tended to spend much more time when they were in groups.

Table 4.32. Occupancy time of users in whole selected settings.

| Occupancy time                   | individual users |        |        | group users |        |        |
|----------------------------------|------------------|--------|--------|-------------|--------|--------|
|                                  | response         | mean   | SD     | response    | mean   | SD     |
| Number of average visit per week | 188              | 10.35  | 8.83   | 196         | 7.21   | 5.85   |
| Occupancy time of each visit     | 191              | 30.63  | 20.77  | 195         | 42.26  | 33.05  |
| Total occupancy time per week    | 191              | 275.25 | 296.99 | 195         | 320.81 | 313.86 |

Respondents were also asked to explain their reasons for choosing a specific place in this setting. Table 4.33 shows these reasons and their percentages. According to the responses, aesthetic-visual-sensational qualities of the space (52.3%), landscape elements (32.3%), proximity to the surrounding buildings (32.3%), shaded space (26.7%) and visibility (18.5%) are the most important reasons in individual use.

On the other hand, in order, aesthetic-visual-sensational qualities of the space (56.3%), landscape elements (40.6%), proximity to the surrounding buildings (25.9%), shaded space (25.9%), central location (25.9%), other people and friends (23.9%) and sittable space (13.2%) were the most indicated reasons in group use. Revealing sensation and perception of aura, responses like beautiful, calm, isolated, quiet, wide, comfortable, spacious, restful, airy and open were categorized as aesthetic-visual-sensational qualities of the settings.

Reflecting a sense of attachment to the space, affective responses (13.3% in individual use, 9.1% in group use) indicated a judgment or a feeling about the setting like the following statements:

"this place has become ours from now on", "I like the school, and this place reminds me that I am in school again", "this is a free place, nobody interferes in what you do", "I like studying where people are and where I can hear birds singing", "I do not like sitting on the grass", "listening to music on the grass outside makes me happy", "this place seems sincere to me", "it is very nice to look at to sky through trees".....etc.

There are also some other reasons which can be combined under the category of functional responses (14.9% in individual use, 12.7% in group use) like the following statements:

"it is an ideal place for chatting", "I can lean on trees", "it is nice to read while lying down on the grass", "it is comfortable to rest on the grass", "it is the only place where I can smoke while sitting", "I usually read while waiting for my friends".....etc.

Table 4.33. Reasons for choosing specific places by both individual and group users for whole settings.

| Reasons for choosing specific places   | individual users |                |             | group users |                |               |
|----------------------------------------|------------------|----------------|-------------|-------------|----------------|---------------|
|                                        | response         | % of responses | % of cases* | response    | % of responses | % of cases**  |
| Aesthetic-visual-sensational qualities | 102              | 17.6%          | 52.3%       | 111         | 17.9%          | 56.3%         |
| Landscape elements                     | 63               | 10.8%          | 32.3%       | 80          | 12.9%          | 40.6%         |
| Proximity to surrounding buildings     | 63               | 10.8%          | 32.3%       | 51          | 8.2%           | 25.9%         |
| Shaded space                           | 52               | 9.0%           | 26.7%       | 51          | 8.2%           | 25.9%         |
| Visibility                             | 36               | 6.2%           | 18.5%       | 22          | 3.6%           | 11.2%         |
| Central location                       | 32               | 5.5%           | 16.4%       | 51          | 8.2%           | 25.9%         |
| Functional response                    | 29               | 5.0%           | 14.9%       | 25          | 4.1%           | 12.7%         |
| Sittable space                         | 28               | 4.8%           | 14.4%       | 26          | 4.2%           | 13.2%         |
| Affective response                     | 26               | 4.5%           | 13.3%       | 18          | 2.9%           | 9.1%          |
| Other people and friends               | 21               | 3.6%           | 10.8%       | 47          | 7.6%           | 23.9%         |
| Being a well-known-specific place      | 19               | 3.3%           | 9.7%        | 26          | 4.2%           | 13.2%         |
| Not crowded and noisy                  | 19               | 3.3%           | 9.7%        | 11          | 1.8%           | 5.6%          |
| Built elements                         | 13               | 2.2%           | 6.7%        | 10          | 1.7%           | 5.1%          |
| Watching people-around                 | 13               | 2.2%           | 6.7%        |             |                |               |
| Weather-climatic conditions            | 13               | 2.2%           | 6.7%        |             |                |               |
| Size-spatial layout                    | 12               | 2.1%           | 6.2%        |             |                |               |
| Topography                             |                  |                |             | 33          | 5.3%           | 16.8%         |
| Other                                  | 40               | 6.9%           | 20.4%       | 42          | 6.8%           | 21.3%         |
| <b>Total</b>                           | <b>581</b>       | <b>100%</b>    | <b>298%</b> | <b>619</b>  | <b>100%</b>    | <b>314.3%</b> |

\* 14 missing cases; 195 valid cases

\*\* 12 missing cases; 197 valid cases



Even though they have less significance, those reasons like being a well-known specific place (9.7% in individual use, 13.2% in group use), not crowded and noisy (9.7% in individual use, 5.6% in group use), built elements (6.7% in individual use), size/spatial layout (6.2% in individual use, 16.8% in group use) were mentioned by users as well. Other reasons included reasons like topography, to be on the road, passer byes, very convenient, scenery, degree of enclosure and planned activities in individual use, while included to be on the road, weather-climatic conditions, very convenient, passer byes, watching people-around, scenery, accessibility, degree of enclosure in group use. Overall, it is interesting to see that in the diversity of all these reasons, some of them were predicted at the beginning of the study, while some others are new factors that affect somehow the use value of outdoors.

Table 4.34 and 4.35 show that there is not much difference between the responses explaining reasons for using and reasons in being in the settings. Even though the order of importance of responses changed, the reasons are mainly the same including chatting, waiting, sitting-resting, having a break, eating-drinking, seeing and meeting friends. These responses also overlap with the major activity types conducted both alone and in groups in the whole selected settings, thus this provides the opportunity of checking the accuracy of responses.

Table 4.34. Reasons for being in the settings while administrating questionnaires.

| What are you doing here at this moment? | response   | % of responses | % of cases*   |
|-----------------------------------------|------------|----------------|---------------|
| Chatting                                | 56         | 24.0%          | 27.1%         |
| Waiting                                 | 52         | 22.3%          | 25.1%         |
| Sitting-resting                         | 47         | 20.2%          | 22.7%         |
| Having a break                          | 17         | 7.3%           | 8.2%          |
| Eating-drinking                         | 14         | 6.0%           | 6.8%          |
| Seeing and meeting friends              | 10         | 4.3%           | 4.8%          |
| Other functional                        | 24         | 10.3%          | 11.6%         |
| Others                                  | 13         | 5.6%           | 6.3%          |
| <b>Total</b>                            | <b>233</b> | <b>100%</b>    | <b>112.6%</b> |

\* 2 missing cases, 207 valid cases

Table 4.35. Reasons for using the settings.

| For what purposes do you generally use this space? | response   | % of responses | % of cases*   |
|----------------------------------------------------|------------|----------------|---------------|
| Sitting-resting                                    | 70         | 23.1%          | 33.8%         |
| Chatting                                           | 58         | 19.1%          | 28.0%         |
| Seeing and meeting friends                         | 38         | 12.5%          | 18.4%         |
| Having a break                                     | 26         | 8.6%           | 12.6%         |
| Eating-drinking                                    | 22         | 7.3%           | 10.6%         |
| Other functional                                   | 57         | 18.8%          | 27.5%         |
| Others                                             | 32         | 10.6%          | 15.5%         |
| <b>Total</b>                                       | <b>303</b> | <b>100%</b>    | <b>146.4%</b> |

\* 2 missing cases, 207 valid cases

A clear finding about the semantic differential scales is that positive associations with all these three settings were observed. Responses almost overlapped with the common selections on positive adjectives such as attractive, inviting, comfortable, beautiful, relaxed and unique. The differences between mean values of responses to semantic differential scales yielded only subtle differences among the responses of male and female groups. It was observed that female group's responses have a little more positive value (Figure 4.14).

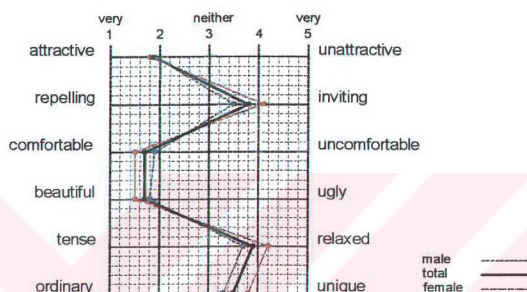


Figure 4.14. Adjective scale rating measuring the meaning of whole selected settings held by users.

Students were asked whether there was anything they wanted to modify or add to make the outdoor spaces more livable (Table 4.36). The majority of outdoor space users wanted more and better seats (34.6%). 32.0% of the responses mentioned more greenery including, more trees, more and better lawns, seasonal flowers. 18.3% of the responses stated that there must be concerts, open-air theater, spring festivals and other cultural and sports activities. Students specified that there must be new water fountains and drinking fountains, and existing water fountains must be kept in good condition (16.3%).

On the other hand, built elements such as more sculptures, movable tables, ramps for the handicapped, and bicycle paths were mentioned by 11.7% of responses. Since pavement in all settings is uneven, making walking difficult, 5.6% of the responses mentioned about better pavement. Users also wanted more cafeterias, which especially have sitting options in outdoors (8.5%).

Some of the students saw the requirement for changing vegetation, for instance, they wanted chestnut or fruit trees instead of poplar or oleaster trees (7.8%).



Maintenance of the space, that is, complaints about the watering period of lawns, keeping the surrounding cleaner or applying pesticide were mentioned 7.8% of responses. 5.2% of these responses referred to design changes like enlarging the width of the space.

Some users stated that there must be more shaded areas, their surroundings must be much more visually attractive, and the architecture must be warmer and more humanistic. They also suggested that it would be nice to hear music in the outdoor spaces. According to this data, it is interesting to note that the majority of the responses were suggestions about the physical features of the settings.

Table 4.36. An analysis of how students modify or change campus outdoor spaces.

| What would you suggest to make the outdoor spaces more livable on this campus? | response   | % of responses | % of cases*  |
|--------------------------------------------------------------------------------|------------|----------------|--------------|
| More and better seats                                                          | 53         | 21.0           | 34.6         |
| More greenery and landscaping                                                  | 49         | 19.5           | 32.0         |
| More events-activities                                                         | 28         | 11.1           | 18.3         |
| Water fountains                                                                | 25         | 10.0           | 16.4         |
| Built elements (sculptures, movable tables, ramps, etc.)                       | 18         | 7.2            | 11.7         |
| Better pavements                                                               | 14         | 5.6            | 9.2          |
| Cafeteria                                                                      | 13         | 5.2            | 8.5          |
| Changing the vegetation                                                        | 12         | 4.8            | 7.8          |
| Maintenance of the space                                                       | 12         | 4.8            | 7.8          |
| More shaded areas                                                              | 11         | 4.4            | 7.2          |
| Changes in spatial layout                                                      | 8          | 3.2            | 5.2          |
| More humanistic, warm & attractive architecture                                | 6          | 2.4            | 3.9          |
| Music                                                                          | 3          | 1.2            | 2.0          |
| <b>Total</b>                                                                   | <b>252</b> | <b>100</b>     | <b>164.7</b> |

\* 56 missing cases, 153 valid cases

\*\* Respondents could specify more than one suggestion; therefore the total does not add up to 100 percent.

Students were asked to rank the order of the statements which explain their decisions about whether they engage in any kind of activity on campus outdoor spaces (Table 4.37). The majority of users selected the functions in surrounding buildings as the main reason. The second reason was the convenience of the space, or its proximity to the workplace. The third reason or the least important one according to users was the physical features of the space.

Table 4.37. Analysis of preference reasons.

| Prefer to use this outdoor space because of . . . | 1 <sup>st</sup> choice |      | 2 <sup>nd</sup> choice |      | 3 <sup>rd</sup> choice |      | total |
|---------------------------------------------------|------------------------|------|------------------------|------|------------------------|------|-------|
|                                                   | N                      | %    | N                      | %    | N                      | %    | N     |
| Its convenience, its proximity to the workplace   | 82                     | 40.2 | 85                     | 41.7 | 37                     | 18.1 | 204   |
| The functions in surrounding buildings            | 92                     | 45.8 | 58                     | 28.9 | 51                     | 25.4 | 201   |
| Its physical features                             | 31                     | 15.5 | 57                     | 28.5 | 112                    | 56.0 | 200   |

## 4.8. Quantitative Analysis Procedure for Whole Sample

Step by step the following quantitative tests, which were descriptive statistical tests, factor analysis, correlational analysis and multiple regression, were run for testing the hypothesis of this study (Ülengin, 2004). The significance level for all of the statistical tests was set at  $p < 0.05$ . Since the use value components of each major setting did not show any significant differences, further quantitative statistical analysis were applied to the whole data.

### 4.8.1. Descriptive Statistical Analysis

In descriptive analyses, sample size (N), range, mean value of each variable, and standard deviation (SD) were included in the tables. Table 4.38 presents the means for social interaction level, indicating that students can usually meet their friends by chance in the settings; and they almost all agree that the campus outdoors have some attributes, thus enhancing social interaction. On the other hand, they are undecided about whether the campus outdoors offers the chance to make new friends, and they usually meet their friends in selected settings.

Table 4.38. Variables measuring social interaction level.

| Social interaction                      | N   | range* | mean | SD   |
|-----------------------------------------|-----|--------|------|------|
| Attributes affording social interaction | 209 | 1-5    | 3.68 | 0.98 |
| Offering chances to make new friends    | 208 | 1-5    | 3.15 | 1.06 |
| Meeting friends by chance in this space | 207 | 1-5    | 4.02 | 1.07 |
| Usually meeting friends in this space   | 207 | 1-5    | 3.39 | 1.12 |

\* 1. strongly disagree 2. disagree 3. neither 4. agree 5. strongly agree

Table 4.39 provides satisfaction degree of users with the physical features of the settings, including the water fountain, greenery, steps, sculptures, ledges, benches, pedestrian pathways, and pavement. According to the users' evaluation, greenery is the most pleasing physical feature, while the pavement is the least.

Table 4.39. Variables showing satisfaction degree with the physical features of the settings.

| Satisfaction degree about physical features      | N   | range* | mean | SD   |
|--------------------------------------------------|-----|--------|------|------|
| Satisfaction degree with the water fountain      | 70  | 1-5    | 3.43 | 0.89 |
| Satisfaction degree with the greenery            | 207 | 1-5    | 4.35 | 0.73 |
| Satisfaction degree with the steps               | 204 | 1-5    | 3.37 | 0.94 |
| Satisfaction degree with the sculptures          | 201 | 1-5    | 3.54 | 0.95 |
| Satisfaction degree with the ledges              | 201 | 1-5    | 3.54 | 0.93 |
| Satisfaction degree with the benches             | 205 | 1-5    | 3.54 | 1.19 |
| Satisfaction degree with the pedestrian pathways | 208 | 1-5    | 3.82 | 0.95 |
| Satisfaction degree with the pavement            | 206 | 1-5    | 3.20 | 1.27 |

\* 1. very unsatisfactory 2. unsatisfactory 3. neither 4. satisfactory 5. very satisfactory

A statistical summary of the indicators, which measure the indirect effects of physical features were presented in Table 4.40. Users usually feel close to nature, but they are between disagreeing and undecided about finding spaces in which they can be alone with enough privacy easily. They almost agree about finding shaded spaces easily.

Table 4.40. Variables showing indirect effects of physical features.

| Indirect effects of physical features                  | N   | range* | mean | SD   |
|--------------------------------------------------------|-----|--------|------|------|
| Finding spaces to be alone easily-privacy in the space | 208 | 1-5    | 2.66 | 1.97 |
| Feeling close to nature                                | 208 | 1-5    | 4.07 | 0.88 |
| Finding shaded spaces easily                           | 208 | 1-5    | 3.96 | 0.93 |

\* 1. strongly disagree 2. disagree 3. neither 4.agree 5. strongly agree

Table 4.41. shows the mean values of enclosure, which is described in terms of the degree of enclosure, boundary conditions and transition spaces. Students almost agree that the location of the buildings encloses the settings well and that they can go from the inside to the outside easily. On the other hand, they are generally undecided about other indicators.

Table 4.41. Variables measuring enclosure in whole settings.

| Enclosure                                                | N   | range* | mean | SD   |
|----------------------------------------------------------|-----|--------|------|------|
| Surrounding the space by buildings                       | 209 | 1-5    | 3.61 | 0.82 |
| Surrounding the space by trees                           | 209 | 1-5    | 3.35 | 1.00 |
| Feeling in an enclosed space                             | 209 | 1-5    | 3.00 | 1.07 |
| Façades that can give clues about interior functions     | 208 | 1-5    | 2.63 | 1.03 |
| Easy visibility from interiors to the exteriors          | 207 | 1-5    | 2.77 | 1.07 |
| Easy access between in and out                           | 208 | 1-5    | 3.59 | 0.98 |
| Adequate connections between internal & external spaces  | 206 | 1-5    | 3.47 | 0.97 |
| Suitable entries and exits in and out of the buildings   | 202 | 1-5    | 3.70 | 0.86 |
| Ground floor functions and their fusion to the exteriors | 209 | 1-5    | 3.27 | 1.05 |

\* 1. strongly disagree 2. disagree 3. neither 4.agree 5. strongly agree

Table 4.42 provides the mean values of use frequency of surrounding buildings, indicating some interior functions like a cafeteria-canteen, classes, photocopy center, conference room, exhibition halls, library-reading hall, laboratories, cinema and students' club rooms.

According to this data, the cafeteria-canteen and classes are the interior functions that respondents use most frequently. The photocopy center and library-reading hall have been mentioned secondly in the order of use frequency. Other functions relatively have been indicated much less by users.

Table 4.43 presents the mean values of variables measuring context. Students agree that settings have central locations on the whole campus, those settings are in the usual circulation on the campus, and they can easily access these settings



from other buildings and spaces between buildings on the whole campus. On the other hand, they are undecided about the location of buildings, which forms shaded spaces by blocking hot sunshine out during the summer time.

Table 4.42. Variables measuring the use frequency of enclosing buildings.

| Use frequency of surrounding buildings         | N   | range | mean | SD   |
|------------------------------------------------|-----|-------|------|------|
| Use frequency of cafeteria-canteen per week    | 209 | 0-60  | 8.75 | 7.52 |
| Use frequency of classes per week              | 209 | 0-30  | 5.36 | 8.05 |
| Use frequency of photocopy center per week     | 209 | 0-25  | 2.50 | 3.96 |
| Use frequency of conference room per week      | 209 | 0-10  | 0.41 | 1.41 |
| Use frequency of exhibition hall per week      | 209 | 0-5   | 0.28 | 0.90 |
| Use frequency of library-reading hall per week | 209 | 0-25  | 1.79 | 3.64 |
| Use frequency of laboratories per week         | 209 | 0-50  | 0.86 | 5.54 |
| Use frequency of the cinema per week           | 209 | 0-2   | 0.15 | 0.35 |
| Use frequency of student clubs rooms per week  | 209 | 0-26  | 0.25 | 2.00 |

Table 4.43. Variables measuring context.

| Context                                                | N   | range* | mean | SD   |
|--------------------------------------------------------|-----|--------|------|------|
| Shaded spaces as a result of the location of buildings | 208 | 1-5    | 3.18 | 1.13 |
| Easy accessibility of the space on the whole campus    | 208 | 1-5    | 3.80 | 0.80 |
| Being in the usual circulation on the campus           | 208 | 1-5    | 4.08 | 1.09 |
| Central location of the space on the campus            | 208 | 1-5    | 4.36 | 0.87 |

\* 1. strongly disagree 2. disagree 3. neither 4.agree 5. strongly agree

Table 4.44 indicates the mean values of variables measuring the spatial layout of settings. According to these values, students almost agree about the statements in Table 4.44.

Table 4.44. Means of variables measuring spatial layout.

| Spatial layout                             | N   | range* | mean | SD   |
|--------------------------------------------|-----|--------|------|------|
| Like the spatial layout or design of space | 209 | 1-5    | 3.66 | 0.79 |
| Providing suitable places for activities   | 209 | 1-5    | 3.65 | 0.79 |
| Perceiving the shape of the space easily   | 209 | 1-5    | 3.60 | 0.93 |
| Perceiving the size of the space easily    | 209 | 1-5    | 3.88 | 0.87 |

\* 1. strongly disagree 2. disagree 3. neither 4.agree 5. strongly agree

A statistical summary of the indicators, which measure pedestrian movement were presented in Table 4.45. Mean values show that students agree about the statements measuring pedestrian movement and they pass through the settings on average eighteen times per week.

Table 4.45. Means of variables measuring pedestrian movement.

| Pedestrian movement                                         | N   | range* | mean  | SD    |
|-------------------------------------------------------------|-----|--------|-------|-------|
| Easy accessibility through the space                        | 209 | 1-5    | 4.01  | 0.76  |
| Density of passer byes through the space affords livability | 209 | 1-5    | 3.93  | 0.88  |
| Like watching passer byes                                   | 209 | 1-5    | 3.94  | 0.94  |
| Frequency of passing through                                | 206 | 1-200  | 18.86 | 21.94 |

\* 1. strongly disagree 2. disagree 3. neither 4.agree 5. strongly agree

Table 4.46 presents the mean values of components measuring user profile. Indicating respondents' attitudes and habits about using the outdoors, these values are over four, which means that users generally like spending time outdoors, when the weather is warm. Other user profile indicators have been presented in which average users' age is 21 and the average total period of residency at the campus is three years.

Table 4.46. Variables measuring user profile.

| User profile                              | N   | range* | mean  | SD   |
|-------------------------------------------|-----|--------|-------|------|
| Age                                       | 209 | 18-32  | 21.24 | 1.96 |
| Length of residency at this campus (year) | 209 | 1-10   | 3.14  | 1.76 |
| Like being outdoors                       | 209 | 1-5    | 4.42  | 0.74 |
| Like having breaks outdoors               | 209 | 1-5    | 4.07  | 0.95 |
| Like having lunch outdoors                | 209 | 1-5    | 4.37  | 0.78 |
| Like spending free time outdoors          | 209 | 1-5    | 4.09  | 0.90 |

\* 1. strongly disagree 2. disagree 3. neither 4. agree 5. strongly agree

Students were also asked to specify how important the presumed factors were when they decide to be in an outdoor space and engage in any kind of activity there according to their point of view. A statistical summary of the importance of the presumed factors that users assigned is shown in Table 4.47. Users found period of time, user profile and physical features as important when engaging in activities in outdoor spaces. Enclosure, visual-sensorial attribute, context, social interaction and pedestrian movement were found to be very close to important. On the other hand, planned activities and spatial layout were assigned neither important nor not important by users.

Table 4.47. An analysis of presumed factors' importance on the use value of campus outdoor spaces according to user evaluation.

| Presumed factors                    | N   | range* | mean | SD   |
|-------------------------------------|-----|--------|------|------|
| Enclosure-having defined boundaries | 207 | 1-5    | 3.82 | 0.97 |
| Physical features                   | 209 | 1-5    | 4.08 | 0.83 |
| Visual-sensorial attributes         | 209 | 1-5    | 3.82 | 0.89 |
| Period of time                      | 208 | 1-5    | 4.19 | 0.88 |
| Context                             | 209 | 1-5    | 3.83 | 1.03 |
| Social interaction                  | 209 | 1-5    | 3.96 | 0.96 |
| Spatial layout                      | 209 | 1-5    | 3.36 | 0.88 |
| Planned activities                  | 209 | 1-5    | 2.79 | 1.11 |
| User profile                        | 208 | 1-5    | 4.18 | 0.84 |
| Pedestrian movement                 | 209 | 1-5    | 3.86 | 1.02 |

\* 1. not important at all 2. not important 3. neither 4. important 5. very important

#### 4.8.2. Factor Analysis

Factor analysis is a multivariate statistical technique; its purpose is of which to replace a collection of inter-correlated variables by another set of variables, called



factors. As being a data reduction process, factors will be fewer in number, relatively independent, conceptually meaningful, that is, plausible in theoretical terms. Keeping in mind its functions, it can be used for a wide variety of purposes, which include;

- (1) detecting clusters of variables, called factors,
- (2) confirming presumed factors' existence or number (Grosos and Sardy, 1985).

In this study, factor analysis has been of benefit due to the second reason, which is sometimes called confirmative factor analysis.

More specifically, in order to see sub-independent variables under each major independent variable, and to explain how users perceived each of them at the same time, factor analysis has been applied to data that constitute these major independent variables. It also made it possible to test the presumed sub-independent variables in the proposed model. "*Period of time*" and "*planned activities*" had to be kept out of this procedure, since factor analysis is a statistical procedure that can be carried out only for the variables that were measured with Likert scales.

In the factor analysis procedure, the first table shows two different tests that indicate the suitability of data for factor analysis. The Kaiser-Meyer-Olkin Measure of Sampling Adequacy is a statistic that indicates the proportion of variance in all variables that might be caused by underlying factors. High values (close to 1.0) generally indicate that a factor analysis may be useful with the data. If the value is less than 0.50, the results of the factor analysis probably won't be very useful. In the Bartlett's Test of Sphericity, if the significance level is less than 0.05, a factor analysis may be useful with data.

The second table explains the amount of the variability in the total variables that can be used in factor analysis, in other words, how much of the information has been lost and how much of the data set can be used. Finally, the third table explains how many components can be used to represent the complexity of whole data, that is, how many groups can be formed from the total variables. Thus, the resulting components or groups are representative of, and can be used in a place of whole data set.

#### 4.8.3. Factor Analysis for Social Interaction

There are totally four variables that identify social interaction in the questionnaire and when factor analysis was applied to those variables, 0.65 value of KMO and the significance value of 0.00 were found indicating the suitability of data for factor analysis as shown in Table 4.48.

Table 4.48. KMO and Bartlett's Tests for social interaction.

|                                                  |                    |             |
|--------------------------------------------------|--------------------|-------------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | <b>.656</b> |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 107.225     |
|                                                  | df                 | 6           |
|                                                  | Sig.               | <b>.000</b> |

Table 4.49 explains nearly 48% of the variability in the original four variables, that is, the complexity of data set can be reduced by using only one component with a nearly 52% loss of information. In other words, there is only one group as the representative of these four variables that indicate social interaction as shown in Table 4.50.

Table 4.49. Total variance explained for social interaction.

| Component | Initial Eigenvalues |               |              | Extraction Sums of Squared Loadings |               |               |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|---------------|
|           | Total               | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative %  |
| 1         | 1.909               | 47.734        | 47.734       | 1.909                               | 47.734        | <b>47.734</b> |
| 2         | .891                | 22.286        | 70.020       |                                     |               |               |
| 3         | .715                | 17.866        | 87.886       |                                     |               |               |
| 4         | .485                | 12.114        | 100.000      |                                     |               |               |

Extraction Method: Principal Component Analysis.

Table 4.50. Component matrix (a) for social interaction.

|                                         | Component<br>1 |
|-----------------------------------------|----------------|
| Attributes affording social interaction | .819           |
| Offering chances to make new friends    | .752           |
| Usually meeting friends in this space   | .581           |
| Meeting friends by chance in this space | .579           |

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

Rotated Component Matrix (a)

a. Only one component was extracted.

The solution cannot be rotated.

#### 4.8.4. Factor Analysis for Physical Features

There are basically seven different physical features, namely, ledges, stairs, sculptures, greenery, pavement, pedestrian pathways and benches that were

included in factor analysis for physical features. Satisfaction degree with the water fountain has been excluded from the physical features during factor analysis procedure, since only one of the three selected settings had this feature. Because, while other features' sample size was 209, its sample size was 70, and this may cause some difficulties with analysis.

According to Table 4.51, 0.70 value of KMO and the significance value of 0.00 indicate the suitability of data for factor analysis.

Table 4.51. KMO and Bartlett's Tests for physical features.

|                                                  |                    |             |
|--------------------------------------------------|--------------------|-------------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | <b>.706</b> |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 236.864     |
|                                                  | df                 | 21          |
|                                                  | Sig.               | <b>.000</b> |

Table 4.52 explains nearly 55% of the variability in the original seven variables, that is, the complexity of data set can be reduced by using two components with nearly 45% loss of information. According to the information in Table 4.53, the size of data file from seven variables of physical features can be reduced to two components.

Unfortunately, it is hard to define conceptually these two groups, or in other words to name them; but basically the first group represents some major elements in the setting that can be perceived independently by users and the second group seems much more related to physical attributes of ground. Therefore, in the further statistical analysis, they were referred to as physical features1 and 2.

Table 4.52. Total variance explained for physical features.

| Component | Initial Eigenvalues |          |                   | Extraction Sums of Squared Loadings |          |                   | Rotation Sums of Squared Loadings |          |                   |
|-----------|---------------------|----------|-------------------|-------------------------------------|----------|-------------------|-----------------------------------|----------|-------------------|
|           | Total               | Variance | % of Cumulative % | Total                               | Variance | % of Cumulative % | Total                             | Variance | % of Cumulative % |
| 1         | 2.519               | 35.981   | 35.981            | 2.519                               | 35.981   | 35.981            | 2.519                             | 35.981   | 35.981            |
| 2         | 1.333               | 19.041   | 55.022            | 1.333                               | 19.041   | 55.022            | 1.333                             | 19.041   | 55.022            |
| 3         | .894                | 12.767   | 67.789            |                                     |          |                   |                                   |          |                   |
| 4         | .718                | 10.261   | 78.050            |                                     |          |                   |                                   |          |                   |
| 5         | .590                | 8.434    | 86.484            |                                     |          |                   |                                   |          |                   |
| 6         | .524                | 7.480    | 93.964            |                                     |          |                   |                                   |          |                   |
| 7         | .423                | 6.036    | 100.000           |                                     |          |                   |                                   |          |                   |

Extraction Method: Principal Component Analysis.

Another factor analysis has been applied to indirect effects of physical features like finding shaded spaces, finding spaces in which users can be alone/ privacy, and feeling close to nature. KMO value of 0.56 and significance level of 0.00 indicates the suitability of data for factor analysis as shown in Table 4.54.

Table 4.53. Rotated Component Matrix (a) for physical features.

|                                                  | Component |      |
|--------------------------------------------------|-----------|------|
|                                                  | 1         | 2    |
| Satisfaction degree with the ledges              | .781      |      |
| Satisfaction degree with the stairs              | .722      |      |
| Satisfaction degree with the sculptures          | .721      |      |
| Satisfaction degree with the greenery            | .439      |      |
| Satisfaction degree with the pavement            |           | .825 |
| Satisfaction degree with the pedestrian pathways |           | .821 |
| Satisfaction degree with the benches             |           | .574 |

Extraction Method: Principal Component Analysis.  
 Rotation Method: Equamax with Kaiser Normalization.  
 Rotation converged in 3 iterations.

Table 4.54. KMO and Bartlett's Tests for indirect effects of physical features.

|                                                  |                    |         |
|--------------------------------------------------|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .564    |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 236.864 |
|                                                  | df                 | 21      |
|                                                  | Sig.               | .000    |

Table 4.55 explains nearly 46% of the variability in the original three variables, so the complexity of data set can be reduced by using only one component with a nearly 54% loss of information. Table 4.56 shows this one group as the representative of three variables that explains the indirect effects of physical features.

Table 4.55. Total variance explained for indirect effects of physical features.

| Component | Initial Eigenvalues |               |              | Extraction Sums of Squared Loadings |               |              |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
|           | Total               | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % |
| 1         | 1.375               | 45.836        | 45.836       | 1.375                               | 45.836        | 45.836       |
| 2         | .884                | 29.455        | 75.291       |                                     |               |              |
| 3         | .741                | 24.709        | 100.000      |                                     |               |              |

Extraction Method: Principal Component Analysis.

Table 4.56. Component Matrix (a) for indirect effects of physical features.

|                                                         | Component |
|---------------------------------------------------------|-----------|
|                                                         | 1         |
| Feeling close to the nature                             | .745      |
| Finding shaded spaces easily                            | .682      |
| Finding spaces to be alone easily/ privacy in the space | .595      |

Extraction Method: Principal Component Analysis.  
 a. 1 component extracted.

Rotated Component Matrix (a)  
 a. Only one component was extracted.  
 The solution cannot be rotated.



#### 4.8.5. Factor Analysis for Enclosure

There are nine variables related to enclosure in the questionnaire, which were included in the factor analysis. In Table 4.57, it is possible to see that the data set is suitable for factor analysis with the value of 0.73 KMO and of 0.00 significance level. Table 4.58 explains nearly 59% of the variability in the original nine variables, so the complexity of data set can be reduced by using three components with a nearly 41% loss of information.

Table 4.57. KMO and Bartlett's Tests for enclosure.

|                                                  |                    |         |
|--------------------------------------------------|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .731    |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 329.553 |
|                                                  | df                 | 36      |
|                                                  | Sig.               | .000    |

Table 4.58. Total variance explained for enclosure.

| Component | Initial Eigenvalues |          |                   | Extraction Sums of Squared Loadings |          |                   |  | Rotation Sums of Squared Loadings |          |                   |  |
|-----------|---------------------|----------|-------------------|-------------------------------------|----------|-------------------|--|-----------------------------------|----------|-------------------|--|
|           | Total               | Variance | % of Cumulative % | Total                               | Variance | % of Cumulative % |  | Total                             | Variance | % of Cumulative % |  |
| 1         | 2.668               | 29.644   | 29.644            | 2.668                               | 29.644   | 29.644            |  | 2.373                             | 26.361   | 26.361            |  |
| 2         | 1.587               | 17.634   | 47.278            | 1.587                               | 17.634   | 47.278            |  | 1.508                             | 16.756   | 43.118            |  |
| 3         | 1.036               | 11.509   | 58.788            | 1.036                               | 11.509   | 58.788            |  | 1.410                             | 15.670   | 58.788            |  |
| 4         | .897                | 9.971    | 68.759            |                                     |          |                   |  |                                   |          |                   |  |
| 5         | .760                | 8.447    | 77.206            |                                     |          |                   |  |                                   |          |                   |  |
| 6         | .675                | 7.501    | 84.706            |                                     |          |                   |  |                                   |          |                   |  |
| 7         | .628                | 6.972    | 91.679            |                                     |          |                   |  |                                   |          |                   |  |
| 8         | .402                | 4.470    | 96.148            |                                     |          |                   |  |                                   |          |                   |  |
| 9         | .347                | 3.852    | 100.000           |                                     |          |                   |  |                                   |          |                   |  |

Extraction Method: Principal Component Analysis.

The factor analysis shows that the data set were grouped into three different components as it was guessed such as transition spaces, degree of enclosure and boundary conditions (Table 4.59). Thus, these components proved the presumed sub-independent variables under enclosure.

Table 4.59. Rotated Component Matrix (a) for enclosure.

|                                                          | Component |      |      |
|----------------------------------------------------------|-----------|------|------|
|                                                          | 1         | 2    | 3    |
| Suitable entries and exits in and out of the buildings   | .834      |      |      |
| Adequate connections between internal & external spaces  | .807      |      |      |
| Easy access in and out                                   | .780      |      |      |
| Ground floor functions and their fusion to the exteriors | .578      |      |      |
| Surrounding the space by buildings                       |           | .764 |      |
| Feeling in an enclosed space                             |           | .727 |      |
| Surrounding the space by trees                           |           | .569 |      |
| Façades that can give clues about interior functions     |           |      | .853 |
| Easy visibility from interiors to the exteriors          |           |      | .868 |

Extraction Method: Principal Component Analysis.

Rotation Method: Equamax with Kaiser Normalization. a. Rotation converged in 5 iterations.



#### 4.8.6. Factor Analysis for Aesthetic-Visual Qualities

In order to evaluate aesthetic and visual qualities, users rated their feelings about the settings by using six positive and six negative adjectives. Table 4.60 shows that this data is suitable for factor analysis with the value of 0.87 KMO and of 0.00 significance level. Table 4.61 explains nearly 67% of the variability in the original twelve variables, so the complexity of data set can be reduced by using two components with a nearly 33% loss of information. As it was expected, Table 4.62 indicates how these twelve variables group into two categories.

Table 4.60. KMO and Bartlett's Tests for aesthetic-visual qualities.

|                                                  |                    |          |
|--------------------------------------------------|--------------------|----------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .877     |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 1607.309 |
|                                                  | df                 | 66       |
|                                                  | Sig.               | .000     |

Table 4.61. Total variance explained for aesthetic-visual qualities.

| Component | Initial Eigenvalues |          |                   | Extraction Sums of Squared Loadings |          |                   | Rotation Sums of Squared Loadings |          |                   |
|-----------|---------------------|----------|-------------------|-------------------------------------|----------|-------------------|-----------------------------------|----------|-------------------|
|           | Total               | Variance | % of Cumulative % | Total                               | Variance | % of Cumulative % | Total                             | Variance | % of Cumulative % |
| 1         | 5.951               | 49.588   | 49.588            | 5.951                               | 49.588   | 49.588            | 4.196                             | 34.970   | 34.970            |
| 2         | 2.062               | 17.186   | 66.774            | 2.062                               | 17.186   | 66.774            | 3.816                             | 31.804   | 66.774            |
| 3         | .912                | 7.599    | 74.373            |                                     |          |                   |                                   |          |                   |
| 4         | .665                | 5.543    | 79.915            |                                     |          |                   |                                   |          |                   |
| 5         | .481                | 4.007    | 83.923            |                                     |          |                   |                                   |          |                   |
| 6         | .391                | 3.262    | 87.184            |                                     |          |                   |                                   |          |                   |
| 7         | .349                | 2.904    | 90.089            |                                     |          |                   |                                   |          |                   |
| 8         | .302                | 2.517    | 92.606            |                                     |          |                   |                                   |          |                   |
| 9         | .277                | 2.311    | 94.918            |                                     |          |                   |                                   |          |                   |
| 10        | .251                | 2.088    | 97.005            |                                     |          |                   |                                   |          |                   |
| 11        | .202                | 1.687    | 98.692            |                                     |          |                   |                                   |          |                   |
| 12        | .157                | 1.308    | 100.000           |                                     |          |                   |                                   |          |                   |

Table 4.62. Rotated Component Matrix (a) for aesthetic-visual qualities.

|               | Component |      |
|---------------|-----------|------|
|               | 1         | 2    |
| Uncomfortable | .879      |      |
| Unattractive  | .872      |      |
| Ugly          | .859      |      |
| Tense         | .829      |      |
| Repelling     | .797      |      |
| Ordinary      | .485      |      |
| Attractive    |           | .821 |
| Inviting      |           | .794 |
| Unique        |           | .770 |
| Beautiful     |           | .762 |
| Comfortable   |           | .723 |
| Relaxed       |           | .699 |

Extraction Method: Principal Component Analysis.

Rotation Method: Equamax with Kaiser Normalization. a. Rotation converged in 3 iterations.

#### 4.8.7. Factor Analysis for Context

Context was measured with four variables in the questionnaire. Table 4.63 indicates the value of 0.63 KMO and of 0.00 significance level, that is, this data is suitable for factor analysis. Table 4.64 explains nearly 45% of the variability in the original four variables, that is, the complexity of data set can be reduced by using only one component with a nearly 55% loss of information. In factor analysis, these four variables together were grouped into only one category (Table 4.65).

Table 4.63. KMO and Bartlett's Tests for context.

|                                                  |                    |        |
|--------------------------------------------------|--------------------|--------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .632   |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 88.657 |
|                                                  | df                 | 6      |
|                                                  | Sig.               | .000   |

Table 4.64. Total variance explained for context.

| Component | Initial Eigenvalues |               |              | Extraction Sums of Squared Loadings |               |              |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
|           | Total               | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % |
| 1         | 1.784               | 44.600        | 44.600       | 1.784                               | 44.600        | 44.600       |
| 2         | .985                | 24.634        | 69.235       |                                     |               |              |
| 3         | .713                | 17.833        | 87.067       |                                     |               |              |
| 4         | .517                | 12.933        | 100.000      |                                     |               |              |

Extraction Method: Principal Component Analysis.

Table 4.65. Component Matrix (a) for context.

|                                                         | Component<br>1 |
|---------------------------------------------------------|----------------|
| Being in the way of the usual circulation on the campus | .790           |
| Central location of the space on the campus             | .787           |
| Easy accessibility of the space on the whole campus     | .690           |
| Shaded spaces as a result of location of buildings      |                |

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

Rotated Component Matrix (a)

a. Only one component was extracted. The solution cannot be rotated.

#### 4.8.8. Factor Analysis for Spatial Layout

Spatial layout was measured with four variables in the questionnaire. Table 4.66 shows the applicability of these data to factor analysis indicating KMO value (0.60) and significance level (0.00). Table 4.67 presents nearly 75% cumulative total variance, namely, there is a 25% loss of information during factor analysis process. The complexity of data set can be reduced by using two components (Table 4.68).

Table 4.66. KMO and Bartlett's Tests for spatial layout.

|                                                  |                    |         |
|--------------------------------------------------|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .600    |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 133.192 |
|                                                  | df                 | 6       |
|                                                  | Sig.               | .000    |

Table 4.67. Total variance explained for spatial layout.

| Component | Initial Eigenvalues |               |              | Extraction Sums of Squared Loadings |               |              | Rotation Sums of Squared Loadings |               |              |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
|           | Total               | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % | Total                             | % of Variance | Cumulative % |
| 1         | 1.923               | 48.085        | 48.085       | 1.923                               | 48.085        | 48.085       | 1.520                             | 38.005        | 38.005       |
| 2         | 1.059               | 26.464        | 74.548       | 1.059                               | 26.464        | 74.548       | 1.462                             | 36.543        | 74.548       |
| 3         | .553                | 13.833        | 88.381       |                                     |               |              |                                   |               |              |
| 4         | .465                | 11.619        | 100.000      |                                     |               |              |                                   |               |              |

Extraction Method: Principal Component Analysis.

Table 4.68. Rotated Component Matrix (a) for spatial layout.

|                                            | Component |      |
|--------------------------------------------|-----------|------|
|                                            | 1         | 2    |
| Providing suitable places for activities   | .887      |      |
| Like the spatial layout or design of space | .838      |      |
| Perceiving the size of the space easily    |           | .843 |
| Perceiving the shape of the space easily   |           | .838 |

Extraction Method: Principal Component Analysis.

Rotation Method: Equamax with Kaiser Normalization.

a. Rotation converged in 3 iterations.

#### 4.8.9. Factor Analysis for Pedestrian Movement

There are totally three variables that identify pedestrian movement in the questionnaire and when factor analysis was applied to those variables, 0.60 value of KMO and the significance value of 0.00 were found to indicate the suitability of data for factor analysis as shown in Table 4.69.

Table 4.69. KMO and Bartlett's Tests for pedestrian movement.

|                                                  |                    |        |
|--------------------------------------------------|--------------------|--------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .602   |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 93.984 |
|                                                  | df                 | 3      |
|                                                  | Sig.               | .000   |

Table 4.70 explains nearly 59% of the variability in the original three variables, that is, the complexity of data set can be reduced by using only one component with a nearly 41% loss of information. In factor analysis, these three variables together were grouped in only one category (Table 4.71).

Table 4.70. Total variance explained for pedestrian movement.

| Component | Initial Eigenvalues |               |              | Extraction Sums of Squared Loadings |               |              |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
|           | Total               | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % |
| 1         | 1.771               | 59.047        | 59.047       | 1.771                               | 59.047        | 59.047       |
| 2         | .754                | 25.133        | 84.180       |                                     |               |              |
| 3         | .475                | 15.820        | 100.000      |                                     |               |              |

Extraction Method: Principal Component Analysis.

Table 4.71. Component Matrix (a) for pedestrian movement.

|                                                             | Component<br>1 |
|-------------------------------------------------------------|----------------|
| Density of passer byes through the space affords livability | .846           |
| Like watching passer byes                                   | .750           |
| Easy accessibility through the space                        | .702           |

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

Rotated Component Matrix (a)

a. Only one component was extracted.

The solution cannot be rotated.

#### 4.8.10. Factor Analysis for User Profile

User profile was measured with four variables in the questionnaire. Table 4.72 indicates the value of 0.80 KMO and of 0.00 significance level, that is, this data is suitable for factor analysis. Table 4.73 explains nearly 67% of the variability in the original four variables, that is, the complexity of data set can be reduced by using only one component with a nearly 33% loss of information. In factor analysis, these four variables together were grouped in only one category (Table 4.74).

Table 4.72. KMO and Bartlett's Tests for user profile.

|                                                  |                    |         |
|--------------------------------------------------|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. |                    | .802    |
| Bartlett's Test of Sphericity                    | Approx. Chi-Square | 311.966 |
|                                                  | df                 | 6       |
|                                                  | Sig.               | .000    |

Table 4.73. Total variance explained for user profile.

| Component | Initial Eigenvalues |               |              | Extraction Sums of Squared Loadings |               |              |
|-----------|---------------------|---------------|--------------|-------------------------------------|---------------|--------------|
|           | Total               | % of Variance | Cumulative % | Total                               | % of Variance | Cumulative % |
| 1         | 2.672               | 66.802        | 66.802       | 2.672                               | 66.802        | 66.802       |
| 2         | .527                | 13.182        | 79.984       |                                     |               |              |
| 3         | .466                | 11.656        | 91.640       |                                     |               |              |
| 4         | .334                | 8.360         | 100.000      |                                     |               |              |

Extraction Method: Principal Component Analysis.



Table 4.74. Component Matrix (a) for user profile.

|                                  | Component<br>1 |
|----------------------------------|----------------|
| Like having lunch outdoors       | .865           |
| Like being outdoors              | .819           |
| Like having breaks outdoors      | .805           |
| Like spending free time outdoors | .777           |

Extraction Method: Principal Component Analysis.

a. 1 component extracted.

Rotated Component Matrix (a)

a. Only one component was extracted.

The solution cannot be rotated.

#### 4.8.11. Correlation Analysis

In order to get associations between major dependent and independent variables and to measure the importance of each independent variable to the major dependent variables, bivariate correlations were used. Correlation tests' results were reported by the tables and scatter diagrams (see Appendix F), which presents N (Sample Size), R (Pearson's Correlation Coefficient), P (Significance Level) for each independent and dependent pairs.

#### 4.8.12. Correlations of Physical Features

Correlation tests between physical features and major dependent variables were carried out as shown in Table 4.75. According to these tests, the correlations between physical features two and dependent variables are not significant, except the one that was between frequency of activities by group and physical features two with the correlation score of 0.19. On the other hand, the Pearson correlations between activity diversity and physical features one and two, again between occupancy time and physical features one and three are significant.

Generally, the correlations reported in Table 4.75 suggest that there are appreciable effects of physical features one and three especially on occupancy time and less significant on activity diversity. With a more clear statement, greenery, steps, sculptures and walls for sitting have more effects on occupancy time of users, and they have less significant effects on activity diversity.

Likewise, finding shaded places in which users can be alone, feeling close to nature have significant effects on occupancy time, they have less significant effects on activity diversity.



Table 4.75. Correlation matrix between physical features and major dependent variables.

| INDEPENDENT VARIABLE 1<br>PHYSICAL FEATURES | physical features 1 |        |      | physical features 2 |        |      | physical features 3 |        |      |
|---------------------------------------------|---------------------|--------|------|---------------------|--------|------|---------------------|--------|------|
|                                             | N                   | R      | P    | N                   | R      | P    | N                   | R      | P    |
| activity diversity by individuals           | 196                 | 0.06   | 0.43 | 195                 | -0.06  | 0.39 | 195                 | 0.00   | 0.99 |
| activity diversity by groups                | 202                 | 0.17*  | 0.01 | 201                 | 0.05   | 0.51 | 201                 | 0.21** | 0.00 |
| total activity diversity                    | 209                 | 0.17*  | 0.01 | 208                 | -0.02  | 0.80 | 208                 | 0.12   | 0.08 |
| frequency of activities by individuals      | 193                 | 0.05   | 0.49 | 192                 | -0.00  | 0.97 | 192                 | 0.08   | 0.25 |
| frequency of activities by groups           | 185                 | 0.11   | 0.12 | 184                 | 0.19** | 0.01 | 184                 | 0.04   | 0.55 |
| total frequency of activities               | 207                 | 0.10   | 0.15 | 206                 | 0.08   | 0.24 | 206                 | 0.07   | 0.30 |
| occupancy time by individuals               | 191                 | 0.15*  | 0.03 | 190                 | 0.06   | 0.39 | 190                 | 0.23** | 0.00 |
| occupancy time by groups                    | 195                 | 0.20** | 0.00 | 194                 | 0.05   | 0.46 | 194                 | 0.20** | 0.00 |
| total occupancy time                        | 206                 | 0.20** | 0.00 | 205                 | 0.07   | 0.30 | 205                 | 0.24** | 0.00 |

\*. Correlation is significant at the 0.05 level (2- tailed).

\*\*. Correlation is significant at the 0.01 level (2- tailed).

Physical features 1 greenery, steps, sculptures, edges or walls for sitting (c45b, c46b, c47b, c48b)

Physical features 2 benches, pedestrian pathways, pavement (c49b, c50b, c51b)

Physical features 3 indirect effects of physical features like shaded space, privacy, feeling close to nature (c52, c53, c54).

#### 4.8.13. Correlations of Enclosure

When we examine the correlations between enclosure and major dependent variables, the most significant relationships are between enclosure four and all other major dependent variables. Enclosure three also has a significant positive correlation with occupancy time by groups (Table 4.76).

Table 4.76. Correlation matrix between enclosure and major dependent variables.

| INDEPENDENT VARIABLE 2<br>ENCLOSURE | enclosure 1 |       |      | enclosure 2 |       |      | enclosure 3 |       |      | enclosure 4 |        |      |
|-------------------------------------|-------------|-------|------|-------------|-------|------|-------------|-------|------|-------------|--------|------|
|                                     | N           | R     | P    | N           | R     | P    | N           | R     | P    | N           | R      | P    |
| activity diversity by individuals   | 196         | 0.03  | 0.68 | 196         | 0.03  | 0.68 | 196         | 0.05  | 0.47 | 196         | 0.21** | 0.00 |
| activity diversity by groups        | 202         | 0.01  | 0.90 | 202         | -0.09 | 0.20 | 202         | -0.08 | 0.25 | 202         | 0.19** | 0.00 |
| total activity diversity            | 209         | 0.01  | 0.91 | 209         | -0.08 | 0.27 | 209         | -0.01 | 0.88 | 209         | 0.24** | 0.00 |
| frequency of activities by individ. | 193         | -0.06 | 0.41 | 193         | 0.02  | 0.75 | 193         | 0.02  | 0.77 | 193         | 0.25** | 0.00 |
| frequency of activities by groups   | 185         | 0.09  | 0.19 | 185         | 0.04  | 0.59 | 185         | -0.02 | 0.76 | 185         | 0.30** | 0.00 |
| total frequency of activities       | 207         | -0.01 | 0.92 | 207         | 0.03  | 0.63 | 207         | 0.01  | 0.85 | 207         | 0.29** | 0.00 |
| occupancy time by individuals       | 191         | 0.05  | 0.48 | 191         | 0.02  | 0.82 | 191         | 0.16* | 0.03 | 191         | 0.37** | 0.00 |
| occupancy time by groups            | 195         | 0.08  | 0.27 | 195         | 0.06  | 0.37 | 195         | 0.06  | 0.38 | 195         | 0.22** | 0.00 |
| total occupancy time                | 206         | 0.06  | 0.40 | 206         | 0.04  | 0.59 | 206         | 0.11  | 0.12 | 206         | 0.32** | 0.00 |

\*. Correlation is significant at the 0.05 level (2- tailed).

\*\*. Correlation is significant at the 0.01 level (2- tailed).

|                                                               |                                                                                                                                                                                                                                 |
|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Enclosure 1: Transition spaces                                | Suitable entries and exits in and out of the buildings (c62)<br>Adequate connections between internal & external spaces (c61)<br>Easy access in and out (c60)<br>Ground floor functions and their fusion to the exteriors (c63) |
| Enclosure 2: Degree of enclosure                              | Surrounding the space by buildings (c55)<br>Feeling in an enclosed space (c57)<br>Surrounding the space by trees (c56)                                                                                                          |
| Enclosure 3: Boundary conditions                              | Façades that can give clues about interior functions (c58)<br>Easy visibility from interiors to the exteriors (c59)                                                                                                             |
| Enclosure 4: Use frequency of surrounding buildings (c64-c72) |                                                                                                                                                                                                                                 |

These correlation scores suggest that transition spaces and degree of enclosure have no effects on dependent variables. Boundary conditions only showed a significant relation with occupancy time by individuals. On the other hand, use frequency of surrounding buildings has effects on all of the dependent variables.

#### 4.8.14. Correlations of Aesthetic-Visual Qualities

According to the correlation results between aesthetic-visual qualities and major dependent variables as shown in Table 4.77, only positive aesthetic qualities showed significant correlations with occupancy time and activity diversity. This suggests that as users get to perceive the settings visually attractive, comfortable, inviting, beautiful, relaxed and unique; they tend to spend much more time there.

Table 4.77. Correlation matrix between aesthetic-visual qualities and major dependent variables.

| INDEPENDENT VARIABLE 3<br>AESTHETIC-VISUAL QUALITIES | positive aesthetic |        |      | negative aesthetic |       |      |
|------------------------------------------------------|--------------------|--------|------|--------------------|-------|------|
|                                                      | N                  | R      | P    | N                  | R     | P    |
| activity diversity by individuals                    | 196                | 0.12   | 0.09 | 195                | 0.09  | 0.21 |
| activity diversity by groups                         | 202                | 0.10   | 0.14 | 201                | -0.13 | 0.06 |
| total activity diversity                             | 209                | 0.14*  | 0.05 | 208                | -0.05 | 0.45 |
| frequency of activities by individuals               | 193                | 0.02   | 0.80 | 192                | 0.01  | 0.89 |
| frequency of activities by groups                    | 185                | 0.09   | 0.23 | 184                | -0.04 | 0.60 |
| total frequency of activities                        | 207                | 0.05   | 0.49 | 206                | -0.01 | 0.91 |
| occupancy time by individuals                        | 191                | 0.12   | 0.10 | 190                | -0.02 | 0.82 |
| occupancy time by groups                             | 195                | 0.23** | 0.00 | 194                | -0.03 | 0.70 |
| total occupancy time                                 | 206                | 0.20** | 0.00 | 205                | -0.02 | 0.73 |

\*. Correlation is significant at the 0.05 level (2- tailed).

\*\*. Correlation is significant at the 0.01 level (2- tailed).

Positive aesthetic Attractive, inviting, comfortable, beautiful, relaxed and unique (c79, c80, c81, c82, c83, c84)

Negative aesthetic Unattractive, uninviting, uncomfortable, ugly, tense and ordinary (c85, c86, c87, c88, c89, c90)

#### 4.8.15. Correlations of Context

When we analyze the effects of context on dependent variables as shown in Table 4.78, it has quite positive significant correlations with activity diversity, occupancy time and frequency of activities. This implies that issues related to context like accessibility, central location, being in the way of usual circulation on the whole campus and shade spaces as a result of the location of the buildings have appreciable effects on activity diversity and occupancy time, but a less significant effect on frequency of activities. Overall, according to this analysis, context is a significant variable on use value components.

Table 4.78. Correlation matrix between context and major dependent variables.

| INDEPENDENT VARIABLE 4<br>CONTEXT      | context |               |      |
|----------------------------------------|---------|---------------|------|
|                                        | N       | R             | P    |
| activity diversity by individuals      | 195     | <b>0.19**</b> | 0.00 |
| activity diversity by groups           | 201     | <b>0.25**</b> | 0.00 |
| total activity diversity               | 208     | <b>0.27**</b> | 0.00 |
| frequency of activities by individuals | 192     | <b>0.15*</b>  | 0.04 |
| frequency of activities by groups      | 184     | 0.13          | 0.08 |
| total frequency of activities          | 206     | <b>0.15*</b>  | 0.03 |
| occupancy time by individuals          | 191     | <b>0.20**</b> | 0.00 |
| occupancy time by groups               | 194     | <b>0.26**</b> | 0.00 |
| total occupancy time                   | 205     | <b>0.27**</b> | 0.00 |

\*. Correlation is significant at the 0.05 level (2- tailed).

\*\*. Correlation is significant at the 0.01 level (2- tailed).

Context    Being in the way of the usual circulation on the campus (c93)  
               Central location of the space on the campus (c94)  
               Easy accessibility of the space on the whole campus (c92)  
               Shaded spaces as a result of the location of the buildings (c91)

#### 4.8.16. Correlations of Spatial Layout

As far as spatial layout's effects on major dependent variables as shown in Table 4.79, the spatial layout one has almost all positive significant relationships with each of the dependent variable components. This means that when users like the spatial layout of the setting, and they believe that, that setting provides suitable places for their activities, this affects activity diversity, frequency of activities and occupancy time positively.

However, correlations between spatial layout two and major dependent variables are not statistically significant. This suggests that when users perceive size and shape of outdoor spaces easily, this does not make any difference on the components of use value on outdoor campus spaces (Table 4.79). All together, only spatial layout one is a significant variable on the use value of campus outdoor spaces.

#### 4.8.17. Correlations of Planned Activities

As for the correlations between planned activities and major dependent variables, the diversity of planned activities has a significant relationship with activity diversity of outdoor spaces. Diversity of participated activities also has correlations with both activity diversity and occupancy time.



Table 4.79. Correlation matrix between spatial layout and major dependent variables.

| INDEPENDENT VARIABLE 5<br>SPATIAL LAYOUT | spatial layout 1 |        |      | spatial layout 2 |       |      |
|------------------------------------------|------------------|--------|------|------------------|-------|------|
|                                          | N                | R      | P    | N                | R     | P    |
| activity diversity by individuals        | 196              | 0.14*  | 0.04 | 196              | -0.05 | 0.46 |
| activity diversity by groups             | 202              | 0.19** | 0.01 | 202              | 0.05  | 0.51 |
| total activity diversity                 | 209              | 0.21** | 0.00 | 209              | -0.01 | 0.85 |
| frequency of activities by individuals   | 193              | 0.12   | 0.09 | 193              | -0.02 | 0.74 |
| frequency of activities by groups        | 185              | 0.20** | 0.00 | 185              | 0.11  | 0.13 |
| total frequency of activities            | 207              | 0.18** | 0.00 | 207              | 0.05  | 0.48 |
| occupancy time by individuals            | 191              | 0.21** | 0.00 | 191              | 0.06  | 0.40 |
| occupancy time by groups                 | 195              | 0.26** | 0.00 | 195              | 0.08  | 0.23 |
| total occupancy time                     | 206              | 0.26** | 0.00 | 206              | 0.07  | 0.31 |

\*. Correlation is significant at the 0.05 level (2- tailed).

\*\*. Correlation is significant at the 0.01 level (2- tailed).

Spatial layout 1 Providing suitable places for activities (c95)  
Like the spatial layout or design of space (c96)

Spatial layout 2 Perceiving the size of the space easily (c97)  
Perceiving the shape of the space easily (c98)

This means that as diversity of planned and participated activities increase, the total activity diversity of the outdoor space becomes more affluent. Besides, as diversity of participated activities increases, users spend much more time in the settings.

Table 4.80. Correlation matrix between planned activities and major dependent variables.

| INDEPENDENT VARIABLE 6<br>PLANNED ACTIVITIES | planned activities 1 |        |      | planned activities 2 |       |      | planned activities 3 |        |      |
|----------------------------------------------|----------------------|--------|------|----------------------|-------|------|----------------------|--------|------|
|                                              | N                    | R      | P    | N                    | R     | P    | N                    | R      | P    |
| activity diversity by individuals            | 181                  | 0.22** | 0.00 | 177                  | 0.00  | 0.98 | 105                  | 0.22** | 0.02 |
| activity diversity by groups                 | 186                  | 0.29** | 0.00 | 182                  | -0.03 | 0.73 | 109                  | 0.14   | 0.15 |
| total activity diversity                     | 191                  | 0.32** | 0.00 | 187                  | -0.00 | 0.92 | 112                  | 0.23** | 0.02 |
| frequency of activities by individuals       | 178                  | 0.03   | 0.69 | 174                  | -0.06 | 0.44 | 104                  | 0.12   | 0.21 |
| frequency of activities by groups            | 169                  | -0.04  | 0.64 | 165                  | -0.09 | 0.23 | 99                   | 0.03   | 0.77 |
| total frequency of activities                | 189                  | 0.00   | 0.99 | 185                  | -0.08 | 0.28 | 111                  | 0.10   | 0.27 |
| occupancy time by individuals                | 177                  | 0.05   | 0.47 | 173                  | -0.00 | 0.96 | 103                  | 0.19   | 0.05 |
| occupancy time by groups                     | 179                  | 0.14   | 0.06 | 175                  | -0.07 | 0.38 | 106                  | 0.25** | 0.00 |
| total occupancy time                         | 188                  | 0.11   | 0.13 | 184                  | -0.04 | 0.63 | 111                  | 0.25** | 0.00 |

\*. Correlation is significant at the 0.05 level (2- tailed).

\*\*. Correlation is significant at the 0.01 level (2- tailed).

Planned activities 1 Diversity of planned activities (c99)

Planned activities 2 Frequency of planned activities (c103, c104, c105)

Planned activities 3 Diversity of participated activities (c110)

#### 4.8.18. Correlations of Pedestrian Movement

According to the correlations in Table 4.81, pedestrian movement one has significant relationships with both activity diversity and occupancy time. On the other hand, pedestrian movement two has the significant correlations with occupancy time and frequency of activities. This suggests that as frequency of passing through the

space becomes denser, users spent much more time in the outdoor space and the frequency of activities that they engage in increases as well.

Table 4.81. Correlation matrix between pedestrian movement and major dependent variables.

| INDEPENDENT VARIABLE 7<br>PEDESTRIAN MOVEMENT | pedestrian movement 1 |        |      | pedestrian movement 2 |        |      |
|-----------------------------------------------|-----------------------|--------|------|-----------------------|--------|------|
|                                               | N                     | R      | P    | N                     | R      | P    |
| activity diversity by individuals             | 196                   | 0.16*  | 0.03 | 193                   | 0.13   | 0.06 |
| activity diversity by groups                  | 202                   | 0.26** | 0.00 | 200                   | 0.10   | 0.16 |
| total activity diversity                      | 209                   | 0.27** | 0.00 | 206                   | 0.14*  | 0.04 |
| frequency of activities by individuals        | 193                   | -0.00  | 0.98 | 190                   | 0.04   | 0.56 |
| frequency of activities by groups             | 185                   | 0.11   | 0.15 | 183                   | 0.25** | 0.00 |
| total frequency of activities                 | 207                   | 0.06   | 0.40 | 204                   | 0.15*  | 0.03 |
| occupancy time by individuals                 | 191                   | 0.15*  | 0.04 | 188                   | 0.24** | 0.00 |
| occupancy time by groups                      | 195                   | 0.19** | 0.01 | 193                   | 0.22** | 0.00 |
| total occupancy time                          | 206                   | 0.19** | 0.00 | 203                   | 0.25** | 0.00 |

\*, Correlation is significant at the 0.05 level (2- tailed).

\*\*, Correlation is significant at the 0.01 level (2- tailed).

Pedestrian movement 1 Density of passer byes through the space affords livability (c112)

Like watching passer byes (c113)

Easy accessibility through the space (c111)

Pedestrian movement 2 Frequency of passing through (c114)

#### 4.8.19. Correlations of User Profile

As shown in Table 4.82, user profile one has significant correlations with occupancy time, activity diversity and frequency of outdoor activities.

Table 4.82. Correlation matrix between user profile and major dependent variables.

| INDEPENDENT VARIABLE 9<br>USER PROFILE | user profile 1 |        |      | user profile 2 |       |      |
|----------------------------------------|----------------|--------|------|----------------|-------|------|
|                                        | N              | R      | P    | N              | R     | P    |
| activity diversity by individuals      | 196            | 0.16*  | 0.03 | 202            | 0.01  | 0.89 |
| activity diversity by groups           | 202            | 0.24** | 0.00 | 202            | 0.01  | 0.89 |
| total activity diversity               | 209            | 0.26** | 0.00 | 209            | 0.09  | 0.17 |
| frequency of activities by individuals | 193            | 0.09   | 0.23 | 193            | -0.10 | 0.14 |
| frequency of activities by groups      | 185            | 0.16*  | 0.03 | 185            | -0.06 | 0.44 |
| total frequency of activities          | 207            | 0.13   | 0.07 | 207            | -0.13 | 0.06 |
| occupancy time by individuals          | 191            | 0.22** | 0.00 | 191            | 0.01  | 0.90 |
| occupancy time by groups               | 195            | 0.21** | 0.00 | 195            | -0.06 | 0.39 |
| total occupancy time                   | 206            | 0.23** | 0.00 | 206            | -0.05 | 0.51 |

\*, Correlation is significant at the 0.05 level (2- tailed).

\*\*, Correlation is significant at the 0.01 level (2- tailed).

User profile 1 Habits and attitudes of using outdoor spaces

Like having lunch outdoors (c122)

Like being outdoors (c120)

Like having breaks outdoors (c121)

Like spending free time outdoors (c123)

User profile 2 Length of residency at this campus (c119)



This clearly suggests that when respondents' habits and attitudes about using outdoor spaces are on a high level, it affects both occupancy time and activity diversity in a positive way.

#### 4.8.20. T and F Test Analyses

The independent-samples T test procedure was used to test the significance of the difference between female and male means (Table 4.83). According to this analysis, female users spend much more time in the settings than male users. They also engage in more diverse activities as compared to the male group.

The One-Way ANOVA procedure is used to test the hypothesis that the means of two or more groups are not significantly different, in other words, the variances of the group means are equivalent. Thus, *F* statistics establish that there is or is not a difference between group means.

Table 4.83. Analysis of dependent variables with respect to gender.

| GENDER ANALYSIS     |                                        | female |        | male |        | <i>t</i> (sig.) |
|---------------------|----------------------------------------|--------|--------|------|--------|-----------------|
|                     |                                        | n      | mean   | n    | mean   |                 |
| dependent variables | activity diversity by individuals      | 96     | 2.24   | 100  | 2.02   | 1.55 (0.12)     |
|                     | activity diversity by groups           | 99     | 2.35   | 103  | 1.99   | 2.57 (0.01)     |
|                     | total activity diversity               | 101    | 2.27   | 108  | 2.00   | 2.35 (0.02)     |
|                     | frequency of activities by individuals | 96     | 5.45   | 97   | 4.96   | 1.00 (0.32)     |
|                     | frequency of activities by groups      | 95     | 5.51   | 90   | 4.98   | 0.97 (0.33)     |
|                     | total frequency of activities          | 101    | 5.42   | 106  | 4.95   | 1.09 (0.28)     |
|                     | occupancy time by individuals          | 95     | 325.00 | 96   | 226.02 | 2.32 (0.02)     |
|                     | occupancy time by groups               | 97     | 390.96 | 98   | 251.37 | 3.17 (0.00)     |
|                     | total occupancy time                   | 100    | 355.37 | 106  | 237.33 | 3.19 (0.00)     |

In order to see the effects of seasons on dependent variables, *F* statistics was used. In Table 4.84, just occupancy time by individuals shows a significant difference among the means of different seasons.

Indicating the significance for mean difference, Table 4.85 presents the Anova tests for period of time with dependent variables. Yet, any of the specific time periods does not show any difference when we examine their means, and significance values.

Table 4.84. One-Way ANOVA analysis for evaluating the effects of season.

| ANALYSIS of SEASON  |                                        |        |        |        |        | does not depend on season |        | F (sig.)    |
|---------------------|----------------------------------------|--------|--------|--------|--------|---------------------------|--------|-------------|
|                     |                                        | spring |        | summer |        |                           |        |             |
|                     |                                        | n      | mean   | n      | mean   | n                         | mean   |             |
| dependent variables | activity diversity by individuals      | 156    | 2.16   | 23     | 2.13   | 14                        | 1.86   | 0.59 (0.55) |
|                     | activity diversity by groups           | 163    | 2.20   | 23     | 2.04   | 13                        | 2.07   | 0.34 (0.72) |
|                     | total activity diversity               | 168    | 2.16   | 23     | 2.08   | 14                        | 2.00   | 0.31 (0.73) |
|                     | frequency of activities by individuals | 153    | 5.29   | 23     | 4.82   | 14                        | 5.17   | 0.20 (0.82) |
|                     | frequency of activities by groups      | 149    | 5.19   | 20     | 4.84   | 13                        | 5.91   | 0.34 (0.72) |
|                     | total frequency of activities          | 166    | 5.21   | 23     | 4.84   | 14                        | 5.49   | 0.21 (0.80) |
|                     | occupancy time by individuals          | 153    | 259.44 | 22     | 249.54 | 14                        | 494.85 | 4.25 (0.01) |
|                     | occupancy time by groups               | 157    | 333.43 | 23     | 210.22 | 13                        | 388.46 | 1.86 (0.16) |
|                     | total occupancy time                   | 166    | 294.79 | 23     | 230.97 | 14                        | 428.43 | 2.40 (0.09) |

Table 4.85. One-Way ANOVA analysis for evaluating the effects of period of time during a week day.

| ANALYSIS of<br>PERIOD of TIME |                                        | < 12 a.m. |        | 12 a.m.-<br>2 p.m. |        | 2 p.m.> |        | F (sig.)    |
|-------------------------------|----------------------------------------|-----------|--------|--------------------|--------|---------|--------|-------------|
|                               |                                        | n         | mean   | n                  | mean   | n       | mean   |             |
| dependent variables           | activity diversity by individuals      | 16        | 1.75   | 118                | 2.22   | 59      | 2.02   | 2.02 (0.14) |
|                               | activity diversity by groups           | 17        | 2.29   | 120                | 2.28   | 60      | 1.91   | 2.88 (0.06) |
|                               | total activity diversity               | 17        | 2.05   | 123                | 2.23   | 64      | 1.95   | 2.51 (0.08) |
|                               | frequency of activities by individuals | 16        | 4.99   | 115                | 5.42   | 59      | 4.85   | 0.58 (0.56) |
|                               | frequency of activities by groups      | 16        | 5.49   | 107                | 5.14   | 57      | 5.42   | 0.14 (0.87) |
|                               | total frequency of activities          | 17        | 5.15   | 121                | 5.28   | 64      | 5.00   | 0.16 (0.85) |
|                               | occupancy time by individuals          | 15        | 186.26 | 117                | 304.02 | 56      | 241.66 | 1.57 (0.21) |
|                               | occupancy time by groups               | 17        | 231.47 | 116                | 350.72 | 57      | 284.29 | 1.60 (0.20) |
|                               | total occupancy time                   | 17        | 215.55 | 122                | 323.99 | 62      | 260.25 | 1.96 (0.14) |

#### 4.8.21. Multiple Regression Analyses

Multiple regression is a multivariate statistic model, which is used to measure the value of a dependent scale variable based on its linear relationship to one or more predictors. In this study, it was used to determine which factors or independent variables were significant in predicting the use value of a campus outdoor space.

Regression analysis reports a significant *F* statistic, which tests the acceptability of the model from a statistical perspective. The significance value of the *F* statistic is less than 0.05, which means that the variation explained by the model is not due to chance. While the *F* statistic is a useful test of the model's ability to explain any variation in the dependent variable, it does not directly address the strength of that relationship.

The regression model also reports the strength of the relationship between the model and the dependent variable with  $R$  and  $R$  Square values.  $R$ , the multiple correlation coefficient, is the linear correlation between the observed and model-predicted values of the dependent variable. Its large value indicates a strong relationship.  $R$  Square, the coefficient of determination, is the squared value of the multiple correlation coefficient, which is a value between 0 and 1 demonstrating the extent to which all independent variables together predicted the model. It shows that how much of the variation in dependent variable is explained by the model.

In general, the  $R^2$  value for most cases had low values ( $<0.22$ ) indicating that the variance in the components of use value as a model was not strongly explained by all the independent variables acting in concert. However, some particular individual independent variables within the model were indicated as significant predictors for the components of use value, when the  $p$ -value was less than 0.05. A regression analysis procedure was carried out for all major components of the use value of campus outdoor spaces. The results of these analyses are summarized below (Table 4.86).

#### **4.8.22. Activity Diversity**

**Model 1** for activity diversity by individuals: With the value of  $F=5.31$ , and  $p=0.00$ , Model 1 indicated that diversity of participated activities ( $p=0.01$ ) and spatial layout1 ( $p=0.02$ ) were the most significant variables according to the model explaining activity diversity by individuals.

**Model 2** for activity diversity by groups: Results indicated that the model for activity diversity by groups was significantly and directly associated with use frequency of enclosing buildings ( $p=0.01$ ), diversity of planned activities ( $p=0.02$ ), and user profile ( $p=0.03$ ).

**Model 3** for total activity diversity: Having the values of  $F=5.50$   $p=0.00$ , this model included context ( $p=0.05$ ), diversity of participated activities ( $p=0.04$ ), use frequency of surrounding buildings ( $p=0.04$ ) as the most significant explanatory variables. In other words, context, diversity of participated activities, and use frequency of surrounding buildings were relevant indicators of the total activity diversity of campus outdoor spaces.

#### 4.8.23. Frequency of Activities

**Model 4** for frequency of individual activities: Model four ( $F=6.78$  and  $p=0.01$ ) only included use frequency of surrounding buildings ( $p=0.01$ ) as the relevant indicator of the frequency of individual activities.

**Model 5** for frequency of group activities: According to this model, frequency of group activities could not been explained by any of the independent variables included in this study.

**Model 6** for total frequency of activities: With the value of  $F=6.62$  and  $p=0.00$ , this model indicated that total frequency of activities on campus outdoor spaces was significantly and directly associated with use frequency of surrounding buildings ( $p=0.00$ ). However, results also indicated that the length of residency at the campus was associated significantly and inversely with total occupancy time ( $p= 0.01$ ).

Table 4.86. A summary of the findings of regression models for whole sample.

| model | dependent variables                | <i>F</i> (sig.) of model | significant independent variables indicated by the model    | <i>T</i> (sig.) |
|-------|------------------------------------|--------------------------|-------------------------------------------------------------|-----------------|
| 1     | Activity diversity by individuals  | 5.31(0.00)               | Diversity of participated activities                        | 2.42 (0.01)     |
|       |                                    |                          | Spatial layout1                                             | 2.22 (0.02)     |
| 2     | Activity diversity by groups       | 6.94 (0.00)              | Use frequency of surrounding buildings                      | 2.48 (0.01)     |
|       |                                    |                          | Diversity of planned activities                             | 2.34 (0.02)     |
|       |                                    |                          | User profile                                                | 2.20 (0.03)     |
| 3     | Total activity diversity           | 5.50 (0.00)              | Context                                                     | 1.92 (0.05)     |
|       |                                    |                          | Diversity of participated activities                        | 2.03 (0.04)     |
|       |                                    |                          | Use frequency of surrounding buildings                      | 2.03 (0.04)     |
| 4     | Frequency of individual activities | 6.78 (0.01)              | Use frequency of surrounding buildings                      | 2.60 (0.01)     |
| 5     | Frequency of group activities      | -                        | None of the independent variables of this study explain it. | -               |
| 6     | Total frequency of activities      | 6.62 (0.00)              | Use frequency of surrounding buildings                      | 2.86 (0.00)     |
|       |                                    |                          | Length of residency at the campus                           | -2.61 (0.01)    |
| 7     | Occupancy time by individuals      | 11.22 (0.00)             | Use frequency of surrounding buildings                      | 3.87 (0.00)     |
|       |                                    |                          | User profile                                                | 2.24 (0.02)     |
| 8     | Occupancy time by groups           | 6.19 (0.00)              | Diversity of participated activities                        | 2.80 (0.00)     |
|       |                                    |                          | Spatial layout1                                             | 2.14 (0.03)     |
| 9     | Total occupancy time               | 7.20 (0.00)              | Use frequency of surrounding buildings                      | 3.13 (0.00)     |
|       |                                    |                          | Diversity of participated activities                        | 2.66 (0.00)     |
|       |                                    |                          | Length of residency at the campus                           | -2.37 (0.01)    |
|       |                                    |                          | User profile                                                | 2.09 (0.03)     |

#### 4.8.24. Occupancy Time

**Model 7** for occupancy time by individuals: Considering the model seven ( $F=11.22$  and  $p=0.00$ ), use frequency of surrounding buildings ( $p=0.00$ ) and user profile ( $p=0.02$ ) were significant predictors in explaining occupancy time by individuals.



**Model 8** for occupancy time by groups: According to this model ( $F=6.19$  and  $p=0.00$ ), diversity of participated activities ( $p=0.00$ ) and spatial layout1 ( $p=0.03$ ) were the significant indicators of occupancy time by groups.

**Model 9** for total occupancy time: According to the last model ( $F=7.20$  and  $p=0.00$ ), total occupancy time was directly and significantly associated with use frequency of buildings ( $p=0.00$ ), diversity of participated activities ( $p=0.00$ ) and user profile ( $p=0.03$ ). On the other hand, results also indicated that length of residency at the campus was associated significantly and inversely with total occupancy time ( $p=0.01$ ).

Overall, regression models suggested that diversity of participated activities, diversity of planned activities, spatial layout 1, use frequency of surrounding buildings, user profile, context, length of residency at the campus are significant independent variables explaining the use value components.

#### **4.8.25. Multiple Regression Analyses for Each Setting**

Multiple regression models for setting A showed that activity diversity was explained by diversity of participated activities. Additionally, it was associated inversely with diversity of planned activities. The same dependent variable, that is activity diversity, was explained by length of residency on the campus, frequency of passing through, and context for setting B; and by diversity of participated activities, use frequency of surrounding buildings, and physical features 2 for setting C (Table 4.87, 4.88, and 4.89).

For setting A, frequency of activities was significantly and directly associated with use frequency of surrounding buildings, positive aesthetic, user profile; on the other hand it was inversely associated with diversity of planned activities. For setting B, it was associated with transition spaces, and degree of enclosure; and for setting C, it was only associated with use frequency of buildings.

Use frequency of surrounding buildings was only predictor of occupancy time for setting A. Frequency of passing through, diversity of participated activities; physical features 2, use frequency of surrounding buildings were the significant indicators of occupancy time for setting B. At the same time, it was inversely associated with diversity of planned activities. Occupancy time for setting C was directly and positively associated with diversity of participated activities, spatial layout1, physical features 3.



Table 4.87. A summary of the findings of regression models for setting A.

| model | dependent variables                | <i>F</i> (sig.)<br>of model | significant independent variables<br>indicated by the model | <i>T</i> (sig.) |
|-------|------------------------------------|-----------------------------|-------------------------------------------------------------|-----------------|
| 1     | Activity diversity by individuals  | 6.59 (0.00)                 | Diversity of participated activities                        | 3.45 (0.00)     |
|       |                                    |                             | Diversity of planned activities                             | -2.27 (0.03)    |
| 2     | Activity diversity by groups       | -                           | None of the independent variables of this study explain it. | -               |
| 3     | Total activity diversity           | -                           | None of the independent variables of this study explain it. | -               |
| 4     | Frequency of individual activities | 7.12(0.00)                  | Use frequency of surrounding buildings                      | 3.10 (0.00)     |
|       |                                    |                             | Diversity of planned activities                             | -2.35 (0.02)    |
|       |                                    |                             | Positive aesthetic                                          | 2.19 (0.03)     |
| 5     | Frequency of group activities      | 6.27 (0.02)                 | Use frequency of surrounding buildings                      | 2.50 (0.02)     |
| 6     | Total frequency of activities      | 7.75 (0.00)                 | Use frequency of surrounding buildings                      | 2.68 (0.01)     |
|       |                                    |                             | User profile                                                | 2.18 (0.04)     |
| 7     | Occupancy time by individuals      | 7.83 (0.01)                 | Use frequency of surrounding buildings                      | 2.79 (0.01)     |
| 8     | Occupancy time by groups           | -                           | None of the independent variables of this study explain it. | -               |
| 9     | Total occupancy time               | 5.60 (0.02)                 | Use frequency of surrounding buildings                      | 2.37 (0.02)     |

Table 4.88. A summary of the findings of regression models for setting B.

| model | dependent variables                | <i>F</i> (sig.)<br>of model | significant independent variables<br>indicated by the model                                                 | <i>T</i> (sig.)                            |
|-------|------------------------------------|-----------------------------|-------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| 1     | Activity diversity by individuals  | 9.93 (0.00)                 | Length of residency at the campus                                                                           | 3.15 (0.00)                                |
| 2     | Activity diversity by groups       | 6.60 (0.00)                 | Frequency of passing through Context                                                                        | 2.50 (0.02)                                |
|       |                                    |                             |                                                                                                             | 2.32 (0.03)                                |
| 3     | Total activity diversity           | -                           | None of the independent variables of this study explain it.                                                 | -                                          |
| 4     | Frequency of individual activities | 4.32 (0.04)                 | Transition spaces                                                                                           | -2.08 (0.04)                               |
| 5     | Frequency of group activities      | -                           | None of the independent variables of this study explain it.                                                 | -                                          |
| 6     | Total frequency of activities      | 6.47 (0.02)                 | Degree of enclosure                                                                                         | 2.54 (0.02)                                |
| 7     | Occupancy time by individuals      | 7.86 (0.00)                 | Frequency of passing through<br>Diversity of participated activities<br>Diversity of planned activities     | 3.68 (0.00)<br>3.17 (0.00)<br>-2.09 (0.04) |
| 8     | Occupancy time by groups           | 8.60 (0.00)                 | Frequency of passing through<br>Physical features 2                                                         | 3.01 (0.00)<br>2.16 (0.03)                 |
| 9     | Total occupancy time               | 14.64(0.00)                 | Frequency of passing through<br>Diversity of participated activities<br>Use frequency of surrounding build. | 5.84 (0.00)<br>3.72 (0.00)<br>2.33 (0.02)  |

When the findings of multiple regression models for each setting were compared among themselves, it was seen that different variable sets for each analyses explained major dependent variables. Even though, it was sometimes noticed overlapping variables in these models for different settings, generally variables, which explain the dependent variables, were different for different settings. This verifies that it is not possible to assume that a certain variable explaining one of the

major dependent variable for one specific setting can be taken as a valid one for another setting.

Table 4.89. A summary of the findings of regression models for setting C.

| model | dependent variables                | F (sig.)<br>of model | significant independent variables<br>indicated by the model                    | T (sig.)                                  |
|-------|------------------------------------|----------------------|--------------------------------------------------------------------------------|-------------------------------------------|
| 1     | Activity diversity by indiv.       | 10.81(0.00)          | Diversity of participated activities                                           | 3.29 (0.00)                               |
| 2     | Activity diversity by groups       | 5.78 (0.06)          | Use frequency of surrounding builds.<br>Physical features2                     | 2.80 (0.00)<br>-2.19 (0.03)               |
| 3     | Total activity diversity           | 13.97(0.00)          | Diversity of participated activities                                           | 3.74 (0.00)                               |
| 4     | Frequency of individual activities | 4.56 (0.04)          | Use frequency of surrounding buildings                                         | 2.14 (0.03)                               |
| 5     | Frequency of group activities      | -                    | None of the independent variables of this study explain it.                    | -                                         |
| 6     | Total frequency of activities      | -                    | None of the independent variables of this study explain it.                    | -                                         |
| 7     | Occupancy time by individuals      | 7.37 (0.01)          | Diversity of participated activities                                           | 2.71 (0.01)                               |
| 8     | Occupancy time by groups           | 6.43 (0.00)          | Diversity of participated activities<br>Spatial layout1<br>Physical features 3 | 3.19 (0.00)<br>2.93 (0.03)<br>2.05 (0.04) |
| 9     | Total occupancy time               | 6.48 (0.00)          | Diversity of participated activities<br>Spatial layout1                        | 2.74 (0.00)<br>2.28 (0.02)                |

#### 4.10. Conclusion

The three major settings have been treated separately while analyzing their use values. In summarizing and discussing the findings, there are slight differences when we compare these settings regarding the components of use value. Analysis of activities and their frequencies showed that major activity types in all selected settings are, in order of importance, sitting-resting, studying-reading, waiting, eating-drinking, playing guitar-listening to music, lying down on lawns-sleeping were among the type of activities conducted alone; chatting, eating-drinking, studying-reading, sitting-resting, sports activities, meeting and games were among the type of activities conducted in groups.

Considering types of activities both conducted alone and groups, it can be said that there are four major activity types in the entire selected settings, that is, sitting-resting, chatting, studying-reading and eating-drinking. Particularly, sitting-resting and chatting are the activity types that users most engaged in and have the highest frequencies (nearly seven times per week). These are the activity types that take longer time or spread out; this implies that users must be spending a lot of time in those selected settings.

Analysis of occupancy time in selected settings also indicated the guessed implication above. While students visited setting A seven times and setting B eight times per week when they were by themselves, setting C was visited thirteen times per week. This is maybe due to the Cafeteria in setting C, where many students have lunch. Students spent approximately half an hour during each visit to all of the settings when they were both by themselves and in groups, except setting B. Students stayed nearly one hour in setting B when they were with their friends. Based on observations, it can be claimed that this is mainly because of the open, shaded grass area around the central monument in which students like spending a lot of time. However, considering these three settings, when students were in groups, they spent an average of fortytwo minutes during each visit. Students generally tend to be in groups of four. Considering total occupancy time per week, when students were spending time with their friends, they stayed nearly one hour more than when they were by themselves.

Behavioral densities of sub-settings in all three major selected settings that can be seen from behavioral mapping are generally consistent with the place preference results of the questionnaires. It must be also noted here that there is a difference in results of observations and interviews concerning activities. It has been noticed during observations that users sometimes engaged in more than one activity at the same time. For instance, one smoked while s/he rested and looked around. However, very few respondents mentioned that s/he engaged in two activities at the same time and the number of those respondents that did is negligible. Most of them only gave the "*dominating activity*" as the response.

Relating to behavioral-sociopetal-sociofugal qualities of specific design features, some "*design implications*" that can be drawn from the case studies both for practice and theory are summarized below:

Many students preferred the seating walls and benches facing the settings where they can see people passing by. The seating edges or walls and side-by-side benches may not be considered as design elements that enhance social interaction or a sociopetal arrangement, since they prevent users' face-to-face interaction by denying them eye contact, and thus expecting to decrease social interaction. Even though they were not seemed as sociable seating, they were used highly. Users primarily preferred seating edges and benches when they wanted to look around, and/ or have a short time break or conversation while smoking. On the contrary to



what was expected, they made spaces more livable by being preferred first and used well.

Both from observations and questionnaires, it has been noticed that while the seating wall or the ledge affords only watching, smoking, or sitting-resting for a short duration, the grassy open area with shaded trees affords many activities like eating, chatting, reading, listening to music and lying down-sleeping. For this reason, the shaded spaces in greenery in all three settings, namely in setting A sub-setting A5, in setting B sub-setting B4, in setting C sub-settings C3 and C5 can be described as *"diversified settings"* for these cases. At the same time, this can be interpreted that green areas with many shaded trees are the most *"behavior-generating"* features for these cases. This also expresses the main idea in which different patterns of the built environment afford different behavior.

Considering the specific physical features as cues for behavior, users selected different sub-settings according to different kinds of activities. For instance, for the activity of waiting and meeting, users preferred the locations adjacent to the surrounding buildings, particularly the front yards in all sub-settings.

In all settings, the main entries to the enclosing buildings or front yards were being used highly. As they are the most adjacent outdoor places to their departments in the setting, many users found them convenient and close to their home-base. Conversely, along the straight edges of the façades, that is, where there was not a relationship between an indoor and outdoor space, there is a clear decrease in use density, suggesting that the boundary treatment between indoor and outdoor affords behavioral density. This proves the concept of the *"edge-effect"*. Likewise, use shows a much more dense character in the areas adjacent to the surrounding buildings compared to open-grassy areas, which generally had a widespread pattern. This might also be an outcome of the edge-effect.

It was noticed in all settings, the duration of activities lasts a much longer time on the grassy-open areas than it does in the front yards of surrounding buildings. For example, users usually spent approximately more than twenty minutes at grassy-open areas while engaging in chatting, games in groups, reading or listening to music by themselves, whereas they only spent a maximum of ten or fifteen minutes in the front yards of surrounding buildings while engaging in waiting for friends, meeting, chance meetings, or chatting for a short period.

Contradictory results about physical features have been found in different question's analysis. Quantitative analyses have not proved much significance with physical features. For instance, correlations between physical features and components of use value have not proven to have significant relationships. However, open ended questions and their qualitative analyses proved that physical features are quite important for the preferences of users. For example, when respondents were asked why they preferred this setting, 32.3% of responses in individual use and 40.6% of responses in group use stated that it was due to the landscape elements including trees, lawns, greenery and the like 6.7% of responses in individual use, 5.1% of responses in group use mentioned built elements of the setting in their responses. Thus, in total, 39.0% of responses in individual use, and 45.7% of responses in group use, mentioned physical features.

Besides, even though the questionnaire results only verified the physical features with the responses of open-ended questions, place-specific behavioral qualities of the settings especially were observed and discussed throughout observations. Like much research in literature, this study has also established the linkage between the physical features of the setting and the activities that occurred there.

Another clear finding was that of the responses to semantic differential scales. Differences between mean values of responses to semantic differential scales yielded subtle differences among the responses to the three settings. It was observed that almost all of the responses overlapped with common selections on positive adjectives such as attractive, inviting, comfortable, beautiful, relaxed and unique. The biggest difference among the responses in the three groups is that the mean values of responses for setting C is the lowest one compared to the other two settings. These findings implied generally positive associations with these three settings regarding the perceived images and thus meanings of these three settings.

It is interesting to note that the new influences may determine the use value of campus outdoor spaces embedded in the responses to one of the open-ended questions, that is, why you prefer this specific place for this activity. Influencing choice and subsequent use patterns, they had not been considered as factors at the beginning of the research. For instance, *"visibility or the presence of good viewing area"* has been specified by 18.5% of respondents in group use and 11.2% of respondents in individual use. Indeed, the visibility capacity of a chosen specific place is a significant factor in its use. People, who can see a large section of the space from where they have been, tend to visit or to be in that specific place



frequently. In other words, views to and from various sub-settings of the whole setting may encourage people to use them and to watch others. Furthermore, other new factors, or a nominee to be a factor, and need to be examined in detail, are *"affective responses"* showing a sense of attachment to the place were mentioned by 13.3% of responses in individual use, and 9.1% of responses in group use; and *"presence of other people and friends"* which was a response by 10.8% of users in individual use and 23.9% of users in group use.

On the other hand, some of the responses have also shown the importance of some presumed factors. For instance, *"proximity to the surrounding building"* (32.3% in individual use, 25.9% in group use), is a significant one of these presumed factors, which was seen both in quantitative analysis as use frequency of surrounding buildings, and in qualitative analysis of the responses to the open-ended questions. Indeed, *"proximity to the high activity building"* seems an important factor according to those analyses, which increases the use value of outdoors. For instance, the Library in setting A, and the Cafeteria in setting C attract many people to adjacent outdoor places. Besides, *"aesthetic-visual-sensational qualities"* (52,3 % in individual use, 56.3% in group use) is another factor that proves one of the initial factors of this study. *"Shaded space"*, *"sittable space"*, *"location"*, *"functional response"*, *"spatial layout"*, *"weather-climatic conditions"* are some of the other responses, which have had relatively less importance.

Correlations proved significant relationships for the factors of context, use frequency of surrounding buildings, and spatial layout<sup>1</sup> and less significant relationships for the factors of physical features, aesthetic-visual qualities, planned activities and pedestrian movement. On the other hand, correlation analysis showed that many of the independent variables have a significant correlation with occupancy time, less significant correlations with activity diversity and the least significant ones with the frequency of activities. In other words, among the dependent variables, occupancy time showed the most significant correlations with independent ones. Secondly, activity diversity has a less number of significant correlations with the independent variables. Finally, frequency of activities has a few significant relationships with the independent ones.

Low R values obtained as a result of correlation analyses show that there are not strong relationships between the dependent and the independent variables. These values led to the thought that it is not possible to explain the dependent variables only with one independent variable and there may be many influential ones in this

problem area. This actually supports the hypotheses of the research and it reveals the requirement of doing multiple-regression analyses.

The regression models were used in the study in order to reveal the relative influences of the independent variables on the use value of campus outdoor spaces. Even though they have not seemed very strong as the models with the low R square values, they indicated some significant independent variables in the model explaining the dependent variables. For instance, with this statistical procedure, diversity of participated activities, spatial layout<sup>1</sup>, use frequency of surrounding buildings, diversity of planned activities, user profile, context, length of residency at the campus were determined as the most significant variables, which explain the use value of campus outdoor spaces. In other words, the more diverse planned and participated activities, the more diverse, frequented, long lasting activities occur on campus outdoor spaces. An outdoor setting, which is central and has high accessibility regarding context probably will have a high use value. The more used surrounding buildings used, the more adjacent outdoor spaces used. The more liked spatial layouts by users, the more used outdoor settings.

Overall, this study revealed some factors that need to be considered in the design of outdoor spaces on campus environments and in the design of outdoor spaces in general. However, it is clear enough that further research concerning these factors that affect the use value of campus outdoor spaces is needed in different contexts.

## 5. CONCLUSIONS AND IMPLICATIONS

"It is clear that today's architects are becoming increasingly concerned with social theory. Architects share a sense of social purpose and believe that their work as architects may potentially improve society.....There are expectations among architects that physical design exerts an impact on the patterns of social life among the users and will directly and deterministically affect the way that people behave".

(Sanoff, 1975, p. 227)

### 5.1. Summary of Findings

This research was an effort that hoped to reveal all possible factors which influence the use value of enclosed outdoor spaces. After the qualitative and quantitative analyses, the significance level of the presumed factors, which were considered at the beginning of the research, can be summarized as follow:

**Physical Features:** Among the sub-components of physical features, only the indirect effects of the physical features like shaded spaces, offering places in which users felt close to a natural environment and places which had enough privacy showed a strong relation with the occupancy time of groups (Table 5.1). Based on both observations and analysis of the responses to the open-ended questions, it is possible to state clearly that the physical features of the environment led to some definite behavior patterns; because environment already offers cues to each behavior pattern. It has been observed that behavior patterns changed according to the different attributes of the environment.

According to the findings of the observations, users had different kinds of activities in different sub-settings depending upon the physical characteristics of those settings. On the other hand, their occupancy time, frequency of their activities changed according to the occupied areas' proximity to the surrounding buildings. In this regard, front yards, open-grassy areas and circulation areas differentiated in terms of these use value components. For example, it has been observed that the most "behavior-generating" feature was open-greenery areas with sheltered trees. The seating walls or ledges and benches were the other physical features that the majority of users preferred. Thus, all of these findings demonstrate the power of physical environment.

**Enclosure:** Use frequency of surrounding buildings showed the most significant relations with almost all of the components of use value (Table 5.1). This means that the more frequently people use indoor functions, the more frequently they use the outdoors; the more they spend time outdoors, the more they engage in diverse activities. Unfortunately, other components of enclosure did not prove to have significant relationships with use value components. The degree of enclosure has a moderate relationship with the total frequency of activities, and boundary condition has a weak relation with the occupancy time of individual activities.

**Aesthetic-Visual Qualities:** When people think that the outdoor space is visually attractive, beautiful, inviting, comfortable and unique, briefly if it has some positive associations in the users mind, it contributes moderately to the frequency of individual activities and total occupancy time (Table 5.1).

**Context:** Context is strongly related to activity diversity; moderately related to the occupancy time; and weakly related to the frequency of activities (Table 5.1). This implies that if the outdoor space has a central location on the whole area, if it is easily accessible, and if it is on the path of everyday circulation, the activity diversity of that outdoor space is likely to be at a high level.

**Spatial Layout:** Spatial layout of the outdoor space is strongly influential on occupancy time, less influential on activity diversity and least influential on the frequency of activities (Table 5.1). This implies that when people like the layout of the setting, they are likely to spend much more time there, and they also engage in more diverse activities. On the other hand, size and shape of the setting, which was considered in spatial layout, has no effect on use value components.

**Planned Activities:** Being one of the most important factors in the proposed model of this thesis, it has strong effects on activity diversity and occupancy time. Specifically, diversity of the participated activities is significant to the activity diversity and occupancy time. In addition, diversity and frequency of planned activities have positive associations with occupancy time (Table 5.1).

**Pedestrian Movement:** According to the data, pedestrian movement, namely, easy accessibility through the space and users' opinion about liking or disliking watching people who pass through is moderately influential on both activity diversity and occupancy time. Additionally, a higher rate of people passing through lead to users spending much more time in the space (Table 5.1).



**User Profile:** Habits and attitudes about using the outdoors have strong relations with occupancy time and activity diversity (Table 5.1). This means that when people like using the outdoors, and spending time there, the occupancy time of users will increase and the diversity of activities are likely to be enriched.

Table 5.1. A relationship matrix illustrating associations between independent and dependent variables of the current study at three different levels, based on the quantitative analyses\*.

|                                                                          |                                  | 11                  | 12                  | 7                                     |                   |                     |                     | 13                                   | 14                 | 1                  | 12      |                  |                  | 5                               | 3                                    |                                 |                     | 8                            | 2                                      | 9                                 | 10 | 6 | 4 |
|--------------------------------------------------------------------------|----------------------------------|---------------------|---------------------|---------------------------------------|-------------------|---------------------|---------------------|--------------------------------------|--------------------|--------------------|---------|------------------|------------------|---------------------------------|--------------------------------------|---------------------------------|---------------------|------------------------------|----------------------------------------|-----------------------------------|----|---|---|
| significant associations between the DEPENDENT and INDEPENDENT variables |                                  | Physical features 1 | Physical features 2 | Indirect effects of physical features | Transition spaces | Degree of enclosure | Boundary conditions | Use frequency of enclosing buildings | Positive aesthetic | Negative aesthetic | Context | Spatial layout 1 | Spatial layout 2 | Diversity of planned activities | Diversity of participated activities | Frequency of planned activities | Pedestrian movement | Frequency of passing through | Habits and attitudes of using outdoors | Length of residency at the campus |    |   |   |
| ACTIVITY DIVERSITY                                                       | Activity diversity (individuals) |                     |                     |                                       |                   |                     |                     | ⊙                                    |                    |                    | ⊙       | ●                |                  |                                 | ●                                    |                                 | ○                   |                              | ○                                      | ⊙                                 |    |   |   |
|                                                                          | Activity diversity (groups)      | ○                   | ○                   | ⊙                                     |                   |                     |                     | ●                                    |                    |                    | ●       |                  |                  | ⊙                               |                                      | ●                               |                     | ○                            | ●                                      |                                   |    |   |   |
| Total activity diversity                                                 |                                  | ○                   |                     |                                       |                   |                     |                     | ●                                    | ○                  |                    | ●       | ○                |                  | ⊙                               | ●                                    |                                 | ⊙                   | ○                            | ⊙                                      |                                   |    |   |   |
| FREQUENCY OF ACTIVITIES                                                  | Frequency of individual act.     |                     |                     |                                       | ○                 |                     |                     | ●                                    | ⊙                  |                    | ○       |                  |                  | ○                               |                                      |                                 |                     |                              |                                        |                                   |    |   |   |
|                                                                          | Frequency of group activities    |                     | ⊙                   |                                       |                   |                     |                     | ●                                    |                    |                    | ○       |                  |                  |                                 |                                      |                                 |                     | ⊙                            | ○                                      |                                   |    |   |   |
|                                                                          | Total frequency of activities    |                     |                     |                                       |                   | ⊙                   |                     | ●                                    |                    |                    | ○       | ○                |                  |                                 |                                      |                                 |                     | ○                            | ⊙                                      | ○                                 |    |   |   |
| OCCUPANCY TIME                                                           | Occupancy time(individuals)      | ○                   |                     |                                       |                   |                     | ○                   | ●                                    |                    |                    | ⊙       | ○                |                  | ○                               | ○                                    |                                 | ⊙                   | ⊙                            | ●                                      |                                   |    |   |   |
|                                                                          | Occupancy time(groups)           | ⊙                   | ⊙                   | ●                                     |                   |                     |                     | ⊙                                    |                    |                    | ●       | ●                |                  | ●                               | ●                                    |                                 |                     | ●                            |                                        |                                   |    |   |   |
|                                                                          | Total occupancy time             | ⊙                   |                     | ⊙                                     |                   |                     |                     | ●                                    | ⊙                  |                    | ○       | ●                |                  |                                 | ●                                    | ●                               | ⊙                   | ⊙                            | ●                                      | ○                                 |    |   |   |

● Strong relation

○ Negative strong relation

⊙ Moderate relation

⊙ Negative moderate relation

○ Weak relation

○ Negative weak relation

\* These relations stemmed from and have been interpreted according to the correlation and multiple regression analyses' results.

**Period of Time:** Doubtless, period of time has some undeniable effects on users' preferences about outdoors. The majority of users (62.5%) stated that they use the outdoors much more frequently in spring, and 21.9% of respondents stated they use outdoors frequently in summer. As for the specific period of time during a weekday,

41.5% of respondents stated that they use the outdoors at noon (specifically 12 a.m.-2 p.m.), 36.1% of respondents stated that they use the outdoors in the afternoon (between 2-p.m.-5.p.m.) and 13.0% of respondents stated that they use the outdoors much more frequently during the morning (< 12 a.m.). However, according to the Anova results, that explain the significance for mean differences, season is especially influential on occupancy time; and period of time during a weekday is not influential on use value components.

The most interesting aspect of the findings is that after the qualitative analyses of open-ended questions, this research revealed that there are other factors that have not been considered while constructing the hypotheses at the beginning of this study. According to the analyses, these new factors are quite influential on the use value of the outdoors.

**Proximity to the high activity buildings:** Actually, it is an effect of enclosure, which was examined in quantitative analyses as use frequency of surrounding buildings. However, it seemed a separate factor from enclosure during the qualitative analysis procedure. According to the findings, both qualitative and quantitative analyses proved that this is one of the most influential among all of the factors on the use value.

**Visibility-the presence of good viewing areas:** Visibility capacity of settings is another factor, which is influential on users' preference. The more diverse and rich the views were in the settings, the more people used and stayed in that setting.

**Presence of other people-friends:** This research showed that one of the main reasons for preferences was other people. Students preferred to be where their friends were. This verifies previous theories like Gehl (1987), which he stated in his famous work, people are attracted to other people; and Whyte (1980), which he similarly stated "*what attracts people most, it would appear, are other people*".

**Attachment to the space:** The idea of "*personal attachment*" not only includes primarily values, attitudes and beliefs, but also a system of memories, feelings and personal interpretations about physical settings. According to the findings, when people feel attached to the setting, this obviously increases their willingness to be in that space; and thus it creates a positive starting point for the livability of the outdoors.

**Sittable space and shaded space:** During the data analyses process, these concepts became one of the matters of primary importance. Especially when the respondents were asked why they preferred this setting, these two concepts seemed crucial to their preference.

According to the findings, it is interesting to note that none of the factors except for the use frequency of surrounding buildings is strongly influential on the frequency of activities. Strong relations are generally with the components of activity diversity and occupancy time.

## **5.2. Hypotheses after Testing**

**Hypothesis 1:** This research proved that there are, in fact, many factors which are influential on the use value of enclosed outdoor spaces. However, some of them are much influential, while others are less influential. The current work provided is able to see their order of importance according to influence degree (Table 5.1).

According to analyses of results, shape and size of the outdoor space, and the transition space have no effects on the use value, so they were taken off the model. In this sense, the overall use of an enclosed outdoor space will obviously be the result of a comprehensive integration of all these related factors / elements. These factors together may establish a model to analyze and evaluate use value in enclosed outdoor spaces (Figure 5.1).

**Hypothesis 2:** Specifically, observations and qualitative analyses proved that diversity, frequency and the duration of activities, which are the components of use value, are a function of physical and architectural features, since they provide cues for actions. On the other hand, it has been seen that some physical features may carry behavior generating attributes much more than some other physical features, as it has been noted earlier in the example of open-grassy areas. Even though the quantitative analyses have not been proved the significance of physical features, observations and qualitative analyses verified that there is strong link between physical features and behavior patterns.

**Hypothesis 3:** Being surrounded by buildings offers a potential user group, which are users of those buildings, to adjacent outdoor spaces. Results about use frequency of surrounding buildings already proved this. Based on the observations, buildings indeed create an influence area around themselves. Use is much denser



in the areas close to buildings. These areas are especially the main entries to the surrounding buildings, namely front yards. Activity types are different in comparison to the areas away from buildings.

Findings also verify the “edge effect”. Because, it is possible to see a clear decrease in use densities where there is no relationship between indoor and outdoor spaces. This also implies that the boundary treatment between indoor and outdoor spaces afford behavioral density. Overall, it is possible to state that there is a positive relationship between the degree of enclosure and the livability of outdoor spaces.

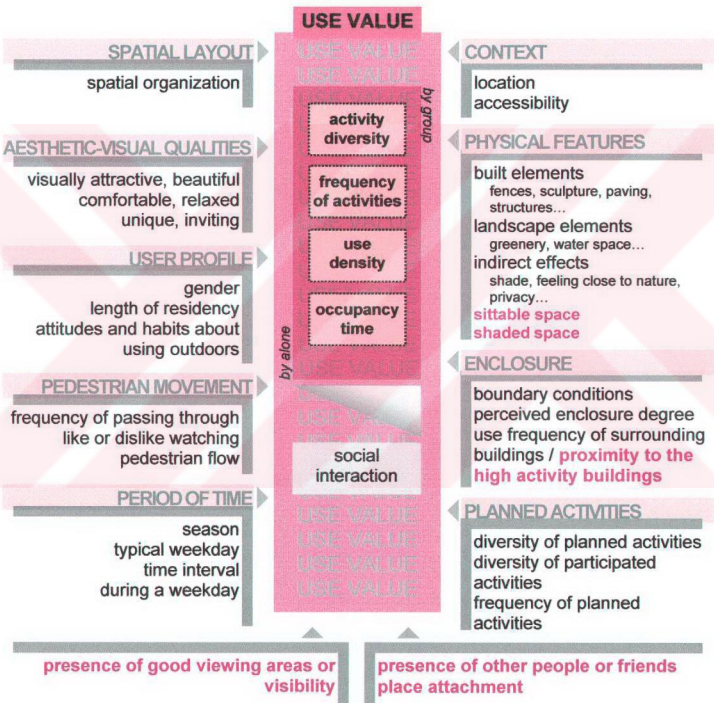


Figure 5.1. The final model, which was reached at the end of the case study results\*.

\* Purple colored statements are the new factors which were found after the case study results.



### 5.3. Answers to Research Questions

Q1. What are the factors, which influence the use value of enclosed outdoor spaces?

A1. See Figure 5.1. to see all factors, which influence the use value of enclosed outdoor spaces. It represents the final model, which was reached at the end of the case study results.

Q1.1. What factors were the most significant in predicting the use value of an enclosed outdoor space? Namely, what is the order of importance of those factors which affect the use value of enclosed outdoor spaces?

A1.1. In Table 5.1. significance level of factors has been presented. Accordingly, the first six in order of importance were (1) enclosure, (2) planned activities), (3) spatial layout), (4) user profile, (5) context and (6) physical features.

Q1.2. Can these factors establish a model to evaluate use value of enclosed outdoor spaces?

A.1.2. It is possible to claim that there is a group of factors influencing use value. However, according to the findings, it is important to keep in mind that each factor's influence degree may change from setting to setting.

Q1.3. Are there any gender differences between behavior patterns?

A1.3. According to the findings, gender is influential on both activity diversity and occupancy time. Females tend to engage in much more diverse activities and spend much more time outdoors than males.

Q2. How influential can physical features be on users' behavior? In other words, to what extent may physical features (especially inferential cues) have an influence on outdoor space use patterns?

A2. According to the observations and qualitative analyses, physical features are especially influential on activity diversity.

Q2.1. Do certain behaviors-use patterns respond to some certain, distinct attributes of the outdoor environment?

A2.1. Doubtless, yes, they do. There is an undeniable relationship between certain behavior patterns and some certain, distinct attributes of the environment.

Q2.2. What physical attributes are chiefly the most influential on the behavior patterns of enclosed outdoor settings?

A2.2. Open grassy areas, benches or sittable space, shaded space, sitting walls, front yards.

Q3. Does enclosure affect the way people use outdoor spaces? Namely, what does enclosure tell to users?

A3. Yes, it does. Especially, use frequency of surrounding buildings / or proximity to high activity buildings is influential on use value, since it provides a potential user group for outdoors. Because of that, use value of enclosed spaces is definitely different as compared to use value of open outdoor spaces.

Q3.1. What specific activities relate to the edge of the space? In other words, what kind of activities does enclosure indirectly lead to as a visual cue?

A3.1. Waiting, meeting, short conversations, and cigarette breaks.

Q3.2. Does the way the boundaries between indoor and outdoor are treated affect the use of urban outdoor spaces?

A3.2. Even though boundary conditions did not show any significant relationship with use value components, observations and behavioral mappings proved that if there is a relationship between indoors and outdoors, use density increases.

#### **5.4. Overall Remarks for Future Implications**

Future implications that can be drawn from this study were outlined in mainly two sections; which are about theoretical issues-research and design-practice as summarized below:

##### **5.4.1. Future Directions about Theoretical Issues and Research**

The existing body of literature has rich empirical findings in regard to the use of outdoor spaces, and thus about related theoretical issues. The important point here is making a connection between empirical findings and theory. When the findings afford theory, or vice versa theory affords findings, the desired point is reached.

This study has been carried out in different settings on the same campus. As a suggestion for future research, new studies should be considered in different contexts, for instance, by selecting different settings on different campuses, comparative case studies can be carried out. Besides, similar research should be employed in enclosed urban outdoor-city spaces. All the findings gathered must be compared to be able to see whether the consequences change according to different contexts.

Another opportunity for future work can be to limit the scope of this kind of research. The current study examined some presumed factors, which were extracted after a

literature review that looked into their effects jointly on the use value of campus outdoor spaces. The factors that have been taken into account together in this study can be separately examined in future researches by selecting settings, which make it possible for other factors to be kept constant.

When starting this research, the aim was to focus on only the effects of enclosure on use value. On the other hand, during selection procedure, it could not be found spaces, which enabled some other major variables to be kept constant but at the same time having different enclosure levels on campus environments. In city spaces, it may be possible to find case study settings, which would enable some factors to be kept constant to a certain degree.

Further research is especially needed to establish theoretical backgrounds of *"presence of other people"*, *"attachment to the space"*, *"visibility"* and *"proximity"* searching into their associations with use value.

#### **5.4.2. Future Directions about Design and Practice**

The most used environmental-physical feature were, in turn, open-grassy areas, walls to sit on or ledges, and benches. It was seen that, especially, open-grassy areas met a wide range of functional needs. Edges providing better viewing areas and sitting options is crucial to afford use value. Innovative design features like nooks, stoops, benches, tables must be added to facilitate and support activities. For example, the design of the stoops and nooks, may allow face-to-face conversation, while also permitting an interested passerby to comfortably join in the conversation by stepping out of the line of traffic.

Arrangement and locations of benches are also important. Arranged in a straight row, they forced individuals to sit shoulder-to shoulder inhibiting rather than supporting social contact. However, when they are well situated for viewing, they may become a successful design feature increasing socializing.

An aesthetically designed environment without the potential to support a range of functional activities is not sufficient to attract people for socializing outdoors. Diverse preplanned activities are significant in supporting use value. In this regard, the ideal situation would be encouraging mixed-functional uses to attract people to outdoor spaces.

Overall, in order to increase the use value of enclosed outdoor spaces, designers should pay more attention to physical features like seating edges or walls and grassy, shaded, quiet areas, which were preferred heavily by users. If the outdoor enclosed public spaces have comfortable seating arranged to enable face-to face interaction, tables, running water, visually enriching sculptures, sufficient greenery, all these elements organized in such a way that can meet users needs easily, these places will be filled with life, with energy, and with a sense of enjoyment for spending time in them. Design criteria like proximity and visibility are also worthy of noticing during design process.

### 5.5. Concluding Remarks

In real life, we face low or none-used outdoor spaces in our surroundings so often. We know that "good" environmental settings are those with the highest behavioral density and greatest diversity. As designers, one of our preliminary tasks is to find out ways to attract people to these spaces and have them stay there, that is, the means of improving livability, or increasing use value. Because of this fact, as an attempt to achieve a deep understanding of the concept of "use value" of campus outdoor spaces in specific, and enclosed outdoor spaces in general, the research in this study examined some presumed factors that have been derived from an existing body of literature and earlier research results; searched for in their significance level to use value.

Generally, the approach to this study was contextual in nature, and one cannot talk about it as a "*universal phenomena*". Its intention was to learn from each case, to draw on some implications without denying the specific nature of any given situation or space.

Yin (1988) emphasizes that case study research is not capable of generalizing findings on other case studies. This is a widespread trap that researchers fall into that is, trying to generalize on findings from one case to another, a difficult task and a common complaint about case studies. Instead, according to Yin (1988), findings should be generalized on theory and a theory must be tested through the replications of findings. At this point, this study was an attempt to generalize its findings on the theory that has been explained in Chapter II. And it is definitely not trying to generalize its findings from the cases in this study to other cases in different places. So it is a contribution, which verifies the theoretical assumptions of this



study. In this respect, it strengthens the validity of theoretical perspective, that outlines its aims.

As a self-criticism, while constructing research problems, the number of variables should have been reduced. Dealing with too many variables led to obtaining some low values during some of the statistical procedures, especially in multiple regression, which was obviously a disadvantage.

More importantly, the architects who will work on the design of campus environments must be aware of the important potential consequences of all these factors on their livability in terms of adequate use and rich use patterns as well. Furthermore, all these factors must be considered and improved not only in campus environments but also in all enclosed outdoor spaces. When the designers understand the potential effects of all these factors on users' behavior and thus their interactions; successful and responsive outdoor environments can only be achieved and improved. Because of the difference between what designers and users value suggests there is a requirement for responsive designers to pay closer attention to the users need. Designers should not think about the environment and the livability within it as two separate entities. Meanwhile, these two units should be designed as one entity, where each serves the other and together provide a complete environment for users. In order to increase livability and thus sociability of enclosed outdoor environments, it is clear enough that architects should pay more attention to the surrounding space of their buildings.

It is important to keep in mind that livability in outdoor spaces (use value of outdoor spaces) depends on many factors working together, yet in different cases some might be more important than others. This study's aim was to reveal several factors, and to prove how influential they are. It is useful to emphasize once again; the findings of the current study can only help to draw some implications for the design of future campus outdoor spaces and the enhancement of use patterns by relating them with factors, but it cannot offer guidelines for making generalizations.

After the analyses of this research, it is important to hold the idea that use value, drawing capacity, holding power of a space or whatever else the description is a very dynamic concept, which may differentiate according to different attributes of settings. For instance, according to the findings, while diversity of participated activities is a significant variable for setting A and setting C, it is not important at all for setting B. Even though the use value of these three settings only showed slight

differences, the influencing factors on their use values differentiated, that is different sets of independent variables were obtained for each of them. Thus the influential degree of those possible factors may change from one setting to another.

The proposed model can only be used to analyze and evaluate the use values of the existing settings and can be a guide for many professions from different disciplines such as, architects, landscape architects, planners, policy makers and even psychologists. As a matter of fact, use value is not a value which can be measurable quantitatively. Because, it is not possible to assign certain ratios for each component; for instance, we do not know how important activity diversity to use value is, what percentage it has in use value as compared to the frequency of activities and occupancy time.

Overall, these potential factors affecting livability can be used to evaluate existing environments; can give guidance to the designers at the design stage and can orient future research as well. However, it is important to keep in mind that in order to identify the variables of this study as factors, they must be tested in different contexts again and again. The expectation is that over time, a body of literature composed of case studies like the one carried out in this thesis will be accumulated and become available to assist both practitioners and theorists in addressing future problems.

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## APPENDIX A: QUESTIONNAIRE

### A MULTI-FACTOR ANALYSIS MODEL TO DETERMINE THE USE VALUE OF ENCLOSED OUTDOOR SPACES

#### A. USE VALUE

##### Use by individuals

- A1. Do you use this space by yourself?  
☐ yes ☐ no K0. [ ]
- A2. How many activities in total do you engage in by yourself  
in this campus outdoor space? ..... K1. [ ]
- A3. What activities do you generally engage in in this campus outdoor space  
by yourself? Could you please indicate how many times per week  
you engage in each activity?
- | activities |          | how many times per week |
|------------|----------|-------------------------|
| 1 .....    | K1a. [ ] | K1b. [ ]                |
| 2 .....    | K2a. [ ] | K2b. [ ]                |
| 3 .....    | K3a. [ ] | K3b. [ ]                |
| 4 .....    | K4a. [ ] | K4b. [ ]                |
| 5 .....    | K5a. [ ] | K5b. [ ]                |
- A4. Please indicate the specific place in this campus outdoor space that you  
prefer for each activity.
- | activities        | place |          |
|-------------------|-------|----------|
| 1. activity ..... |       | K6. [ ]  |
| 2. activity ..... |       | K7. [ ]  |
| 3. activity ..... |       | K8. [ ]  |
| 4. activity ..... |       | K9. [ ]  |
| 5. activity ..... |       | K10. [ ] |
- A5. Please explain why you prefer this specific place particularly for  
the activities you engaged in in this campus outdoor space.  
**why this specific place?**
- |                   |          |
|-------------------|----------|
| 1. activity ..... | K11. [ ] |
| .....             | K12. [ ] |
| 2. activity ..... | K13. [ ] |
| .....             | K14. [ ] |
| 3. activity ..... | K15. [ ] |
| .....             | K16. [ ] |
| 4. activity ..... | K17. [ ] |
| .....             | K18. [ ] |
| 5. activity ..... | K19. [ ] |
| .....             | K20. [ ] |
- A6. How many times per week do you visit this campus outdoor space?  
.....times K21. [ ]
- A7. How long, on average, do you stay in this space for each visit?  
.....minutes K22. [ ]
- A8. How long per week do you use this space in total?  
.....minutes K23. [ ]

### Use by groups

- A9. Do you use this space as a group?  
☐ yes ☐ no K24. [ ]
- A10. How many people are there usually in your group?  
 .....people K25. [ ]
- A11. How many times per week do you get together or meet with your friends in this space? .....times K26. [ ]
- A12. How long, on average, do you stay in this space for each visit as a group?.....minutes K27. [ ]
- A13. How long per week do you use this space as a group in total? .....minutes K28. [ ]
- A14. How many activities totally do you engage in with your group of friends in this campus outdoor space? K29. [ ]
- A15. What activities do you generally engage in in this outdoor campus space as a group? Could you please indicate how many times per week you engage in each activity?
- | group activities |          | how many times per week |
|------------------|----------|-------------------------|
| 1 .....          | K30a.[ ] | .....K30b.[ ]           |
| 2 .....          | K31a.[ ] | .....K31b.[ ]           |
| 3 .....          | K32a.[ ] | .....K32b.[ ]           |
| 4 .....          | K33a.[ ] | .....K33b.[ ]           |
| 5 .....          | K34a.[ ] | .....K34b.[ ]           |
- A16. Please indicate the specific place in this campus outdoor space that you prefer for each activity.
- | activities        | place    |
|-------------------|----------|
| 1. activity ..... | K.35.[ ] |
| 2. activity ..... | K.36.[ ] |
| 3. activity ..... | K.37.[ ] |
| 4. activity ..... | K.38.[ ] |
| 5. activity ..... | K.39.[ ] |
- A17. Please explain why you prefer this specific place particularly for the activities you engaged in in this campus outdoor space.  
 why this specific place?
- |                  |         |
|------------------|---------|
| 1. activity..... | K40.[ ] |
| .....            | K41.[ ] |
| 2. activity..... | K42.[ ] |
| .....            | K43.[ ] |
| 3. activity..... | K44.[ ] |
| .....            | K45.[ ] |
| 4. activity..... | K46.[ ] |
| .....            | K47.[ ] |
| 5. activity..... | K48.[ ] |
| .....            | K49.[ ] |
- A18. What are you doing here at this moment?
- |       |         |
|-------|---------|
| ..... | K50.[ ] |
| ..... | K51.[ ] |
| ..... | K52.[ ] |
- A19. For what purposes do you generally use this space?
- |       |         |
|-------|---------|
| ..... | K53.[ ] |
| ..... | K54.[ ] |
| ..... | K55.[ ] |



## B. SOCIAL INTERACTION

- B1. There are some statements below that are related to social interaction-communication among students. For each statement, please indicate whether you  
1.strongly disagree, 2.disagree, 3.neither, 4.agree, or 5.strongly agree.

|                                                                                                               | 1                        | 2                        | 3                        | 4                        | 5                        |         |
|---------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| I think this campus outdoor space has qualities which can increase my social interaction with other students. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K56.[ ] |
| This outdoor space offers chances to be able to make friends in campus life.                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K57.[ ] |
| I can easily come across with other students from the different faculties of the university in this space.    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K58.[ ] |
| I usually meet with my friends in this space.                                                                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K59.[ ] |

## C. PHYSICAL FEATURES

- C1. Please specify what physical features there are in this space, and then evaluate your satisfaction degree concerning these physical features by using the five scales below.  
1.very unsatisfactory/2.unsatisfactory/3.neither/4.satisfactory/5.very satisfactory

|                     | existing                 | non-existing             |          | 1                        | 2                        | 3                        | 4                        | 5                        |          |
|---------------------|--------------------------|--------------------------|----------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------|
| water fountain      | <input type="checkbox"/> | <input type="checkbox"/> | K60a.[ ] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K60b.[ ] |
| greenery            | <input type="checkbox"/> | <input type="checkbox"/> | K61a.[ ] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K61b.[ ] |
| steps               | <input type="checkbox"/> | <input type="checkbox"/> | K62a.[ ] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K62b.[ ] |
| sculptures          | <input type="checkbox"/> | <input type="checkbox"/> | K63a.[ ] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K63b.[ ] |
| ledges              | <input type="checkbox"/> | <input type="checkbox"/> | K64a.[ ] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K64b.[ ] |
| benches             | <input type="checkbox"/> | <input type="checkbox"/> | K65a.[ ] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K65b.[ ] |
| pedestrian pathways | <input type="checkbox"/> | <input type="checkbox"/> | K66a.[ ] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K66b.[ ] |
| pavement            | <input type="checkbox"/> | <input type="checkbox"/> | K67a.[ ] | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K67b.[ ] |

- C2. There are some statements below that are related to the indirect effects of the physical features of the outdoor space. For each statement, please indicate whether you

1.strongly disagree, 2.disagree, 3.neither, 4.agree or 5.strongly agree.

|                                                                                       | 1                        | 2                        | 3                        | 4                        | 5                        |         |
|---------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| There are places in this space which have enough privacy and in which I can be alone. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K68.[ ] |

I feel myself close to nature since this setting has sufficient greenery. ☐ ☐ ☐ ☐ ☐ K69.[ ]

I can find shaded spaces in this setting when the weather is hot. ☐ ☐ ☐ ☐ ☐ K70.[ ]

#### D. ENCLOSURE

- D1. There are some statements below that are related to relations between buildings and outdoor spaces. For each statement, please indicate whether you  
1.strongly disagree, 2.disagree, 3.neither, 4.agree or 5.strongly agree.

|                                                     | 1                        | 2                        | 3                        | 4                        | 5                        |         |
|-----------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| Location of the buildings encloses this space well. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K71.[ ] |

|                                                    |                          |                          |                          |                          |                          |         |
|----------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| Trees contribute defining the edges of this space. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K72.[ ] |
|----------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|

|                                      |                          |                          |                          |                          |                          |         |
|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| I feel in a well defined space here. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K73.[ ] |
|--------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|

|                                                                                    |                          |                          |                          |                          |                          |         |
|------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| Façades of the buildings give enough clues about the functions of interior spaces. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K74.[ ] |
|------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|

|                                                 |                          |                          |                          |                          |                          |         |
|-------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| I can see the outdoor spaces from indoors well. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K75.[ ] |
|-------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|

|                                                 |                          |                          |                          |                          |                          |         |
|-------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| I can go from the inside to the outside easily. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K76.[ ] |
|-------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|

|                                                                          |                          |                          |                          |                          |                          |         |
|--------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| There are enough connections between interior spaces and outdoor spaces. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K77.[ ] |
|--------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|

|                                             |                          |                          |                          |                          |                          |         |
|---------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| Entrances and exits are in suitable places. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K78.[ ] |
|---------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|

|                                                                                                                      |                          |                          |                          |                          |                          |         |
|----------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|
| Functions on the ground floor of these buildings that surround this space can easily be penetrated from the outside. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K79.[ ] |
|----------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------|

- D2. Please check the activities on the ground floor of surrounding buildings that you use in this space. How many times per week do you use each of them?

| activities in surrounding buildings                  | how many times per week |         |
|------------------------------------------------------|-------------------------|---------|
| <input type="checkbox"/> Cafeteria, canteen etc.     | .....times              | K80.[ ] |
| <input type="checkbox"/> Classes                     | .....times              | K81.[ ] |
| <input type="checkbox"/> Bookstore, photocopy center | .....times              | K82.[ ] |
| <input type="checkbox"/> Conference hall             | .....times              | K83.[ ] |
| <input type="checkbox"/> Exhibition hall             | .....times              | K84.[ ] |
| <input type="checkbox"/> Library, reading room       | .....times              | K85.[ ] |

|                                             |            |         |
|---------------------------------------------|------------|---------|
| <input type="checkbox"/> Laboratories       | .....times | K86.[ ] |
| <input type="checkbox"/> Cinema             | .....times | K87.[ ] |
| <input type="checkbox"/> Student club rooms | .....times | K88.[ ] |

## E. AESTHETIC-VISUAL QUALITIES

E1. Could you please evaluate your feelings about this campus outdoor space by using the adjective scales below? 1.very 2.fairly 3.neither 4.fairly 5.very

|             | 1                        | 2                        | 3                        | 4                        | 5                        |               |         |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|---------------|---------|
| attractive  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | unattractive  | K89.[ ] |
| repelling   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | inviting      | K90.[ ] |
| comfortable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | uncomfortable | K91.[ ] |
| beautiful   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | ugly          | K92.[ ] |
| tense       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | relaxed       | K93.[ ] |
| ordinary    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | unique        | K94.[ ] |

E2. Please rank your feelings about this campus outdoor space from 1 to 5 with these adjectives.

|               |                          |                          |                          |                          |                          |          |
|---------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------|
| attractive    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K95.[ ]  |
| inviting      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K96.[ ]  |
| comfortable   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K97.[ ]  |
| beautiful     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K98.[ ]  |
| relaxed       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K99.[ ]  |
| unique        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K100.[ ] |
| unattractive  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K101.[ ] |
| repelling     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K102.[ ] |
| uncomfortable | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K103.[ ] |
| ugly          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K104.[ ] |
| tense         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K105.[ ] |
| ordinary      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K106.[ ] |

## F. CONTEXT

F1. There are some statements below that are related to the location of buildings. For each statement, please indicate whether you 1.strongly disagree, 2.disagree, 3.neither, 4.agree, or 5.strongly agree.

|                                                                                                         | 1                        | 2                        | 3                        | 4                        | 5                        |          |
|---------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------|
| Location of buildings form shaded spaces by blocking hot sunshine during the summer time.               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K107.[ ] |
| I can easily access this setting from other buildings and spaces between buildings on the whole campus. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K108.[ ] |
| This space is on my path for everyday circulation through the whole campus.                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K109.[ ] |
| This space has a central location on the whole campus.                                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K110.[ ] |

## G. SPATIAL LAYOUT

- G1. There are some statements below that are related to the spatial layout of this space. For each statement below, please indicate whether you 1.strongly disagree, 2.disagree, 3.neither, 4.agree or 5.strongly agree.

|                                                                                            | 1                        | 2                        | 3                        | 4                        | 5                        |          |
|--------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------|
| I like the layout of this space.                                                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K111.[ ] |
| The layout of this space provides suitable places for my activities.                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K112.[ ] |
| I can easily distinguish and define the shape of this space.                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K113.[ ] |
| The size of this space is close to human dimensions, and thus can easily be distinguished. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K114.[ ] |

## H. PLANNED ACTIVITIES

- H1. How many planned activities totally have been arranged in this campus outdoor space?..... K115.[ ]
- H2. What kind of planned activities like festivals, protests, and graduation ceremonies have taken place in this campus outdoor space?  
 ..... K116.[ ]  
 ..... K117.[ ]  
 ..... K118.[ ]
- H3. How many times per year do the activities that you specified above occur in this space?  
 ..... K119.[ ]  
 ..... K120.[ ]  
 ..... K121.[ ]
- H4. Do you participate in these activities?  
☐ yes ☐ no ☐ sometimes ☐ passive participation..... K122.[ ]
- H5. If you do, in which ones do you participate?  
 ..... K123.[ ]  
 ..... K124.[ ]  
 ..... K125.[ ]
- H6. How many activities that you participated in are there? ..... K126.[ ]

## I. PEDESTRIAN MOVEMENT

- I1. There are some statements below that pertain to pedestrian movement in this outdoor space. For each statement, please indicate whether you 1.strongly disagree, 2.disagree, 3.neither, 4.agree or 5.strongly agree.

|                                                                                                          | 1                        | 2                        | 3                        | 4                        | 5                        |          |
|----------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------|
| Pedestrian pathways that pass through the space provide easy access to buildings and adjacent locations. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K127.[ ] |



People who pass through the setting add dynamism to this space making me feel that this space has a life within itself.

☐ ☐ ☐ ☐ ☐ K128.[ ]

I like watching the people, activities and the dynamics of life.

☐ ☐ ☐ ☐ ☐ K129.[ ]

I2. How many times per week do you pass through this space?..... K130.[ ]

## J. PERIOD OF TIME

J1. In which season do you use this space most frequently? ..... K131.[ ]

J2. In which hours during the day do you use this space most frequently?  
..... K132.[ ]

## K. USER PROFILE

K1. Your age ..... K133.[ ]

K2. Your gender ☐ woman ☐ man ..... K134.[ ]

K3. What semester are you in? ..... K135.[ ]

K4. How many years have you been a student on this campus? ..... K136.[ ]

K5. There are some statements below that are related to using outdoor spaces. For each statement, please indicate whether you

1.strongly disagree, 2.disagree, 3.neither, 4.agree, or 5.strongly agree.

|                                              | 1                        | 2                        | 3                        | 4                        | 5                                 |
|----------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------------|
| I like using outdoor spaces in good weather. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> K137.[ ] |

|                                                                                       |                          |                          |                          |                          |                                   |
|---------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------------|
| I usually spend the breaks between classes in outdoor space when the weather is warm. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> K138.[ ] |
|---------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------------|

|                                                                         |                          |                          |                          |                          |                                   |
|-------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------------|
| I usually spend lunch hours in outdoor spaces when the weather is warm. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> K139.[ ] |
|-------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------------|

|                                                                          |                          |                          |                          |                          |                                   |
|--------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------------|
| I usually spend my free time in outdoor spaces when the weather is warm. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> K140.[ ] |
|--------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------------------------|

## L. GENERAL EVALUATION

L1. Please rank the statements concerning the use of this space below from the most important to the least important.

☐ I prefer using this space because it is on my way and convenient. K141.[ ]

☐ I prefer using this space because there are my daily activities in the surrounding buildings. K142.[ ]

☐ I prefer using this space because its physical features provide suitable places for my activities. K143.[ ]

- L2. Please specify how important the statements below are to you when you engage in any kind of activity in this campus outdoor space.  
 1. not important at all 2. not important 3. neither 4. important 5. very important

|                                                                                                                                                                                 | 1                        | 2                        | 3                        | 4                        | 5                        |          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|----------|
| having defined boundaries of the outdoor space, functions on the ground floor of the buildings (like the cafeteria, canteen), and daily activities in the surrounding buildings | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K144.[ ] |
| physical features of the space, that is, trees, lawns, benches, water fountain, pavement, etc.                                                                                  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K145.[ ] |
| being a visually attractive space                                                                                                                                               | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K146.[ ] |
| enjoying the nice weather                                                                                                                                                       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K147.[ ] |
| being in a central location for the whole campus                                                                                                                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K148.[ ] |
| having more chances to come across with your friends and other students in this space                                                                                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K149.[ ] |
| having a good layout for this setting                                                                                                                                           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K150.[ ] |
| participating in some planned activities                                                                                                                                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K151.[ ] |
| enjoying spending some time in outdoor spaces                                                                                                                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K152.[ ] |
| watching the world go by and the people who go through the space                                                                                                                | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K153.[ ] |

- L3. What kind of changes do you suggest to make this space more livable?  
 ..... K154.[ ]  
 ..... K155.[ ]  
 ..... K156.[ ]  
 ..... K157.[ ]

*thank you very much for your contribution . . .*

## APPENDIX B: AN EXAMPLE OF A FILLED OUT QUESTIONNAIRE

ANKET FORMU: KUŞATILMIŞ DIŞ MEKANLARDAKİ YAŞANTIMI DEĞERLENDİRMEK İÇİN ÇOK FAKTÖRLÜ BİR MODEL

### A. KULLANIM DEĞERİ

#### BİREYSEL KULLANIM

K.O.L7

- A1. Bu mekanda tek başınıza genellikle hangi aktivite/ yada aktiviteleri gerçekleştiriyorsunuz? Belirttiğiniz her bir aktiviteyi bir günde kaç kez gerçekleştiriyorsunuz?

| aktivite |             | bir günde kaç kez |              |
|----------|-------------|-------------------|--------------|
| 1. ...   | K.1. a[ 1 ] | 1 veya 3          | K.1.b [ 10 ] |
| 2. ...   | K.2. a[ 3 ] | 1                 | K.2.b [ 5 ]  |
| 3. ...   | K.3. a[ 2 ] |                   | K.3.b [ 5 ]  |
| 4. ...   | K.4. a[ 1 ] | 1                 | K.4.b [ 5 ]  |
| 5. ...   | K.5. a[ 1 ] |                   | K.5.b [ 5 ]  |

- A2. Belirttiğiniz her bir aktivite için size gösterilen haritadaki kodlardan yararlanarak mekanın özellikle hangi noktasını kullandığınızı belirtiniz.

| aktivite     | yer |              |
|--------------|-----|--------------|
| 1. aktivite: | ... | K.6. [ 39 ]  |
| 2. aktivite: | ... | K.7. [ 59 ]  |
| 3. aktivite: | ... | K.8. [ 59 ]  |
| 4. aktivite: | ... | K.9. [ 59 ]  |
| 5. aktivite: | ... | K.10. [ 59 ] |

- A3. Bu mekan içinde belirttiğiniz aktiviteler için niçin mekanın özellikle o bölgesini seçtiğinizi açıklayınız.

| aktivite     | niçin özellikle belirttiğiniz yer? |              |
|--------------|------------------------------------|--------------|
| 1. aktivite: | ...Mekanda ...                     | K.11. [ 20 ] |
| 2. aktivite: | ...Mekanda ...                     | K.12. [ 20 ] |
| 3. aktivite: | ...Mekanda ...                     | K.13. [ 20 ] |
| 4. aktivite: | ...Mekanda ...                     | K.14. [ 16 ] |
| 5. aktivite: | ...Mekanda ...                     | K.15. [ 16 ] |
|              | ...                                | K.16. [ 17 ] |
|              | ...                                | K.17. [ 17 ] |
|              | ...                                | K.18. [ 17 ] |
|              | ...                                | K.19. [ 17 ] |
|              | ...                                | K.20. [ 17 ] |

- A4. Bir günde ortalama kaç kez çeşitli amaçlarla bu mekanı kullanıyorsunuz?.....3.....kez

- A5. Bu mekanı kullanmıyorsanız eğer, nedeni nedir?

|     |              |
|-----|--------------|
| ... | K.22. [ 15 ] |
| ... | K.23. [ 15 ] |
| ... | K.24. [ 15 ] |
| ... | K.25. [ 15 ] |

- A6. Her ziyaretinizde ortalama ne kadar süreyle bu mekanda kalıyorsunuz?.....30.....dk

- A7. Bir günde ortalama olarak bu mekanı toplam ne kadar süreyle kullanıyorsunuz?.....30.....dk.

|     |               |
|-----|---------------|
| ... | K.26. [ 450 ] |
| ... | K.27. [ 450 ] |
| ... | K.28. [ 450 ] |
| ... | K.29. [ 450 ] |

#### GRUP KULLANIMI: Sosyal etkileşim

- A8. Genellikle kaç kişilik gruplarla bir arada bulunuyorsunuz?.....5-6.....kişi

- A9. Günde kaç kez arkadaşlarınızla bu mekanda buluşursunuz yada bir araya gelirsiniz?.....2.....kez

- A10. Grup olarak her ziyaretinizde ortalama ne kadar süreyle bu mekanda kalıyorsunuz?.....30.....dk

- A11. Grup olarak bir günde ortalama olarak bu mekanı toplam ne kadar süreyle kullanıyorsunuz?.....1.62.....dk

|     |               |
|-----|---------------|
| ... | K.30. [ 300 ] |
| ... | K.31. [ 300 ] |
| ... | K.32. [ 300 ] |
| ... | K.33. [ 300 ] |
| ... | K.34. [ 300 ] |
| ... | K.35. [ 300 ] |

- A12. Arkadaşlarınızla bir aradayken, grup olarak bu mekanda genellikle hangi aktivite/ yada aktiviteleri gerçekleştiriyorsunuz? Belirttiğiniz her bir aktiviteyi bir günde kaç kez gerçekleştiriyorsunuz?

| grup aktiviteleri |               | bir günde kaç kez |               |
|-------------------|---------------|-------------------|---------------|
| 1. ...            | K.31. a[ 11 ] | 2                 | K.31.b [ 10 ] |
| 2. ...            | K.32. a[ 10 ] | 1                 | K.32.b [ 5 ]  |
| 3. ...            | K.33. a[ 10 ] | 1                 | K.33.b [ 5 ]  |
| 4. ...            | K.34. a[ 10 ] | 1                 | K.34.b [ 5 ]  |
| 5. ...            | K.35. a[ 10 ] | 1                 | K.35.b [ 5 ]  |

- A13. Belirttiğiniz her bir aktivite için size gösterilen haritadaki kodlardan yararlanarak mekanın özellikle hangi noktasını kullandığınızı belirtiniz.

| aktivite     | yer |              |
|--------------|-----|--------------|
| 1. aktivite: | ... | K.36. [ 39 ] |
| 2. aktivite: | ... | K.37. [ 59 ] |
| 3. aktivite: | ... | K.38. [ 59 ] |
| 4. aktivite: | ... | K.39. [ 59 ] |
| 5. aktivite: | ... | K.40. [ 59 ] |

- A14. Bu mekan içinde o aktivite için niçin mekanın özellikle o bölgesini seçtiğinizi açıklayınız.
- |              |                                                           |             |
|--------------|-----------------------------------------------------------|-------------|
| 1. aktivite: | Toplamak, saklamak, etmek için uygun bir alan.            | K.41.[ 41 ] |
| 2. aktivite: | Genel olarak, bir yer, bir alanı bir araya getirmek için. | K.42.[ 20 ] |
| 3. aktivite: | Genel olarak, bir yer, bir alanı bir araya getirmek için. | K.43.[ 41 ] |
| 4. aktivite: | Genel olarak, bir yer, bir alanı bir araya getirmek için. | K.44.[ 20 ] |
| 5. aktivite: | Genel olarak, bir yer, bir alanı bir araya getirmek için. | K.45.[ 41 ] |
|              | Genel olarak, bir yer, bir alanı bir araya getirmek için. | K.46.[ 41 ] |
|              | Genel olarak, bir yer, bir alanı bir araya getirmek için. | K.47.[ 41 ] |
|              | Genel olarak, bir yer, bir alanı bir araya getirmek için. | K.48.[ 41 ] |
|              | Genel olarak, bir yer, bir alanı bir araya getirmek için. | K.49.[ 41 ] |

- A15. Aşağıda bu kampus mekanındaki öğrenciler arası iletişime / etkileşime ilişkin ifadeler yer verilmiştir. Her bir ifadeye ne derece katılıp katılmadığınızı belirtir misiniz?

|                                                                                                                                | 1                        | 2                                   | 3                                   | 4                        | 5                                   |            |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------------------------------|------------|
| 1. kesinlikle katılmıyorum / 2. katılmıyorum / 3. ne katılmıyorum, ne katılıyorum / 4. katılıyorum / 5. kesinlikle katılıyorum |                          |                                     |                                     |                          |                                     |            |
| Bu kampus mekanının diğer öğrencilerle sosyal etkileşimimi artırıcı özelliklere sahip olduğunu düşünüyorum.                    | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.50.[ 5 ] |
| Bu mekan kampustaki yaşamda yeni arkadaşlar edinmek için fırsatlar sunuyor.                                                    | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | K.51.[ 3 ] |
| Bu mekanda kolaylıkla üniversitenin diğer tüm fakültelerinden öğrencilerle karşılaşabiliyorum.                                 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | K.52.[ 2 ] |
| Arkadaşlarımla çoğunlukla bu mekanda buluşurum.                                                                                | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.53.[ 5 ] |

- A16. Şu anda burada niçin bulunuyorsunuz?
- |                     |            |
|---------------------|------------|
| .....Dinlenmek..... | K.54.[ 1 ] |
| .....Okumak.....    | K.55.[ 1 ] |

- A17. Genelde bu mekanı niçin kullanırsınız?
- |                     |            |
|---------------------|------------|
| .....Dinlenmek..... | K.56.[ 1 ] |
| .....Okumak.....    | K.57.[ 6 ] |

## B. MEKANIN FİZİKSEL NİTELİKLERİ

- B1. Aşağıdaki elemanlardan hangilerinin bu mekanda olduğunu belirtiniz, var olan elemanlarla ilgili memnuniyet derecenizi aşağıdaki farklı ölççek yardımıyla bir değerlendirilmesini yapınız.

|                                                                                                   | var                      | yok                                 | 1                                   | 2                        | 3                        | 4                        | 5                                   |              |
|---------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|-------------------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------|
| 1. Hiç memnun değil / 2. Memnun değil / 3. Ne memnun, ne memnun değil / 4. Memnun / 5. Çok memnun |                          |                                     |                                     |                          |                          |                          |                                     |              |
| Su elemanı/havuz                                                                                  | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.58.[ 1 ]   |
| Yeşil alanlar;ağaçlar,çimenler                                                                    | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.59.[ 5 ]   |
| Basamaklar, merdivenler                                                                           | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | K.62.[ 998 ] |
| Heykeller                                                                                         | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | K.63.[ 998 ] |
| Duvarlar                                                                                          | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | K.64.[ 998 ] |
| Oturma bankları                                                                                   | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | K.65.[ 1 ]   |
| Yaya yolları                                                                                      | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.66.[ 5 ]   |
| Yer kaplaması (döşeme)                                                                            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.67.[ 5 ]   |

- B3. Aşağıda bu kampus mekanının fiziksel nitelikleriyle sunduğu olanaklara ilişkin ifadeler yer verilmiştir. Her bir ifadeye ne derece katılıp katılmadığınızı belirtir misiniz?

|                                                                                                                                | 1                        | 2                                   | 3                        | 4                                   | 5                        |            |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|------------|
| 1. kesinlikle katılmıyorum / 2. katılmıyorum / 3. ne katılmıyorum, ne katılıyorum / 4. katılıyorum / 5. kesinlikle katılıyorum |                          |                                     |                          |                                     |                          |            |
| Bu mekanda yalnız kalabileceğim, mahremiyeti fazla olan yerler var.                                                            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | K.78.[ 2 ] |
| Mekanın bol yeşilinin olması dolayısıyla kendimi doğaya yakın hissediyorum.                                                    | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.79.[ 4 ] |
| Sıcak havalarda gölgeli yerler bulabiliyorum.                                                                                  | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.80.[ 4 ] |

## C. KUŞATILMIŞLIK

- C1. Aşağıda bu kampus mekanındaki binalar ile dış mekanlar arasındaki ilişkiler hakkındaki ifadeler yer verilmiştir. Her bir ifadeye ne derece katılıp katılmadığınızı belirtir misiniz?

|                                                                                                                                | 1                        | 2                                   | 3                        | 4                                   | 5                        |            |
|--------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|--------------------------|------------|
| 1. kesinlikle katılmıyorum / 2. katılmıyorum / 3. ne katılmıyorum, ne katılıyorum / 4. katılıyorum / 5. kesinlikle katılıyorum |                          |                                     |                          |                                     |                          |            |
| Binaların konumu bu dış mekanı iyi çeviriyor, sınırlandırıyor.                                                                 | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.81.[ 4 ] |
| Ağaçlar bu mekanın sınırlarının tanımlanmasına katkıda bulunuyor.                                                              | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | K.82.[ 2 ] |
| Kendimi burada sınırları belirlenmiş bir mekanda hissediyorum.                                                                 | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.83.[ 4 ] |
| Kolaylıkla tanımlanabilir bir mekan olduğundan kendimi burada güvende hissediyorum.                                            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.84.[ 4 ] |
| Binanın dış cepheleri iç mekanlardaki fonksiyonlar hakkında yeterince ipucu veriyor.                                           | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | K.85.[ 2 ] |
| Binanın iç mekanlarından dışarıyı yeterince görülebiliyor.                                                                     | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | K.85.[ 2 ] |



|                                                                                                                                             |                          |                                     |                          |                          |            |
|---------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|--------------------------|--------------------------|------------|
| İç mekandan dış mekana kolaylıkla ve rahat bir şekilde geçebiliyorum.                                                                       | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K.86.[ 2 ] |
| Binanın iç mekanları ile dış mekanlar arasında yeterince bağlantı var.                                                                      | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K.87.[ 2 ] |
| Giriş/çıkış kapıları binada uygun yerlerde bulunmaktadır.                                                                                   | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K.87.[ 2 ] |
| Bu mekânı çevreleyen binaların zemin katlarındaki işlevlerin dış mekânla direkt bağlantıları var ve bu işlevler dış mekâna da taşabiliyor.. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | K.88.[ 2 ] |

- C2. Bu mekânı çevreleyen binaların zemin katlarında hangi işlevlere sahip mekanları, bir günde ne sıklıkta kullanıyorsunuz?

|                                                                                    |             |             |
|------------------------------------------------------------------------------------|-------------|-------------|
| İşlevler                                                                           | ne sıklıkta |             |
| <input checked="" type="checkbox"/> Kafeterya yada kantin gibi yeme-içme birimleri | ...3... kez | K.89.[ 15 ] |
| <input checked="" type="checkbox"/> Derslikler                                     | ...4... kez | K.90.[ 20 ] |
| <input checked="" type="checkbox"/> Kitap satış, kırtasiye, fotokopi               | ...1... kez | K.91.[ 5 ]  |
| <input type="checkbox"/> Konferans salonu                                          | ... kez     | K.92.[ ]    |
| <input type="checkbox"/> Sergi mekanları                                           | ... kez     | K.93.[ ]    |
| <input checked="" type="checkbox"/> Kütüphane/ okuma salonu                        | ...2... kez | K.94.[ 10 ] |
| <input type="checkbox"/> Diğer.....                                                | ... kez     | K.95.[ ]    |

#### D. GÖRSEL/DUYUSAL NİTELİKLER

- D1. Bu kampus dış mekânı hakkındaki duygularınızı aşağıdaki sıfat çiftleri yardımıyla değerlendirir misiniz?

|                |                                     |                                     |                                     |                          |                |              |
|----------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|----------------|--------------|
| çekici         | çok/                                | az/                                 | ne çok, ne az/                      | çok                      | itici          | K.96.[ 2 ]   |
| davetkar değil | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | davet edici    | K.97.[ 3 ]   |
| rahatlatıcı    | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | rahatsız edici | K.98.[ 1 ]   |
| güzel          | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | çirkin         | K.99.[ 1 ]   |
| gergin         | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | rahat          | K.100.[ 2 ]  |
| sıradan        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | özgün          | K.100a.[ 3 ] |

1 en az 5 en çok olmak üzere bu mekânı aşağıdaki sıfatlara göre derecelendirin.

|                |                                     |                                     |                                     |                                     |                          |             |
|----------------|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|--------------------------|-------------|
| çekici         | 1                                   | 2                                   | 3                                   | 4                                   | 5                        | K.101.[ 3 ] |
| davet edici    | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | K.102.[ 2 ] |
| rahatlatıcı    | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.103.[ 4 ] |
| güzel          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | K.104.[ 3 ] |
| rahat          | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.105.[ 4 ] |
| özgün          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | K.106.[ 2 ] |
| itici          | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | K.107.[ 2 ] |
| davetkar değil | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | K.108.[ 2 ] |
| rahatsız edici | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | K.109.[ 1 ] |
| çirkin         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | K.110.[ 1 ] |
| gergin         | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/>            | <input type="checkbox"/> | K.111.[ 1 ] |
| sıradan        | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | K.112.[ 3 ] |

#### E. BAĞLAM

- E1. Aşağıda bu kampus mekanında binaların konumlarına ilişkin ifadeler yer verilmiştir. Her bir ifadeye ne derece katılıp katılmadığınızı belirtir misiniz?

1. kesinlikle katılmıyorum / 2. katılmıyorum / 3. ne katılıyorum, ne katılmıyorum / 4. katılıyorum / 5. kesinlikle katılıyorum

|                                                                                                             |                          |                                     |                          |                                     |             |
|-------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------|
| Bu mekânda dolaşırken binaların konumundan dolayı oluşan rüzgardan olumsuz etkilenmekteyim.                 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | K.113.[ 2 ] |
| Binaların konumu özellikle yazın yakıcı güneş ışınlarını engelleyip gölgeli yerler oluşturuyor.             | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.114.[ 4 ] |
| Bu mekâna kampus içindeki diğer binalardan ve binalar arasındaki dış mekanlardan kolaylıkla ulaşabiliyorum. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | K.115.[ 2 ] |
| Her günkü kampus içi yaya dolaşımda bu mekân yolunun üzerindedir.                                           | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.116.[ 4 ] |
| Bu mekân kampus içinde merkezi bir konumdadır.                                                              | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | K.117.[ 5 ] |

#### F. MEKANSAL DÜZEN

- F1. Aşağıdaki her bir ifadeye ne derece katılıp katılmadığınızı belirtir misiniz?

1. kesinlikle katılmıyorum / 2. katılmıyorum / 3. ne katılıyorum, ne katılmıyorum / 4. katılıyorum / 5. kesinlikle katılıyorum

|                                                                                                            |                          |                          |                                     |                                     |             |
|------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------|
| Bu mekânın tasarım düzenini beğeniyorum.                                                                   | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | K.118.[ 3 ] |
| Bu mekânın tasarım düzeni aktivitelerim için uygun yerler sağlıyor.                                        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | K.119.[ 4 ] |
| Bu mekânın biçimini (yani kare, dikdörtgen, vb. olup olmadığını) rahatlıkla algılayıp, tanımlayabiliyorum. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | K.120.[ 4 ] |
| Bu mekânın büyüklüğü kolaylıkla algılanabilir, insancıl boyutlardadır.                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | K.121.[ 4 ] |

## G. ÖNCEDEN PLANLANMIŞ AKTİVİTELER

- G1. Bu mekanda önceden planlanmış festival, şenlik, protesto gösterisi, mezuniyet töreni gibi aktivitelerden hangileri gerçekleştiriliyor?  
 ..... Bazen protesto gösterileri ..... bazen de kireysel ..... K.122.[ 1 ]  
 ..... miting dinletileri ..... gerçekleştiriyor ..... K.123.[ 6 ]  
 ..... K.124.[ ]
- G2. Yukarıda belirttiğiniz aktiviteler ortalama olarak yılda kaç kez düzenleniyor?  
 ..... protesto gösterileri ..... 1 veya 2 ..... K.125.[ 1 ]  
 ..... miting dinletileri ..... haftada 1 veya 2 kez ..... K.126.[ 24 ]  
 ..... K.127.[ ]
- G3. Siz bu aktivitelere katılıyor musunuz? ..... miting dinletilerine ..... bazen katılıyorum ..... K.128.[ 3 ]
- G4. Katılıyorsanız, hangilerine?  
 ..... K.129.[ 6 ]  
 ..... K.130.[ ]  
 ..... K.131.[ ]

## H. YAYA HAREKETİ

- H1. Aşağıda bu kampus mekanındaki yaya hareketine ilişkin ifadelere yer verilmiştir. Her bir ifadeye ne derece katılıp katılmadığınızı belirtir misiniz?

1.kesinlikle katılmıyorum / 2.katılmıyorum / 3.ne katılıyorum / 4.katılıyorum / 5. kesinlikle katılıyorum

- |                                                                                                                        | 1                        | 2                                   | 3                        | 4                                   | 5                                   |             |
|------------------------------------------------------------------------------------------------------------------------|--------------------------|-------------------------------------|--------------------------|-------------------------------------|-------------------------------------|-------------|
| Mekanın içinden geçen yaya yolları beni binalara ve yakın çevreye rahatlıkla ulaştırıyor.                              | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | K.132.[ 4 ] |
| Mekanın içinden gelip geçenler bu mekana dinamizm katıyor, bu mekanın yaşadığını hissettiriyor.                        | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | K.133.[ 4 ] |
| Mekanın içinde akıp giden yaşamı, gelip geçen insanları seyretmeyi severim.                                            | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/> | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | K.134.[ 5 ] |
| Mekanın içinden gelip geçenlerin yoğunluğu, bu mekanda herhangi bir aktivite gerçekleştirmeyi olumsuz yönde etkiliyor. | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            | K.135.[ 2 ] |

- H2. Bu mekanın içinden günde kaç kez geçersiniz? ..... 10-15 ..... kez K.136.[ 60 ]

## I. ZAMAN ARALIĞI

- I1. Hangi mevsimde bu mekânı daha çok kullanırsınız? ..... Bahar mevsiminde ..... K.137.[ 1 ]
- I4. Günüün hangi saatlerinde bu mekânı daha çok kullanırsınız? ..... 09:00-12:00 ..... K.142.[ 2 ]

## J. KULLANICI PROFİLİ

- J1. Yaşınız ..... 21 ..... K.146.[ 21 ]
- J2. Cinsiyetiniz ☒ Kadın ☐ Erkek ..... K.147.[ 1 ]
- J3. Kaçınıcı sınıf öğrencisi siziz? ..... 2 ..... K.148.[ 2 ]
- J4. Kaç sendedir bu kampusta öğrenci olarak bulunuyorsunuz? ..... 3 ..... K.149.[ 3 ]
- J5. Aşağıda dış mekan kullanımına yönelik ifadeler yer verilmiştir.

Her bir ifadeye ne derece katılıp katılmadığınızı belirtir misiniz?  
 1.kesinlikle katılmıyorum / 2.katılmıyorum / 3.ne katılıyorum / 4.katılıyorum / 5. kesinlikle katılıyorum

- |                                                                                                 | 1                        | 2                        | 3                        | 4                                   | 5                        |             |
|-------------------------------------------------------------------------------------------------|--------------------------|--------------------------|--------------------------|-------------------------------------|--------------------------|-------------|
| Uygun iklimsel koşullarda dış mekanları kullanmayı severim.                                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.150.[ 4 ] |
| Uygun iklimsel koşullarda ders aralanrı çoğunlukla dışarıda geçiririm.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.151.[ 4 ] |
| Uygun iklimsel koşullarda öğle tatilini çoğunlukla dışarıda geçiririm.                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.152.[ 4 ] |
| Uygun iklimsel koşullarda kampustaki kendime ait boş vakitlerimi çoğunlukla dışarıda geçiririm. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | K.153.[ 4 ] |

- J6. Bu mekanın kullanımıyla ilgili aşağıdaki ifadelerden hangisi size uyar?

- ☒ Gelip geçerken yolumun üzerinde, elverişli bir mekan olduğu için kullanmayı tercih ediyorum. K.154.[ 2 ]
- ☒ Bu mekânı çevreleyen binalarda günlük aktivitelerim yer aldığı için, bu mekan kampustaki günümün çoğunluğunun geçtiği binalara yakın olduğu için tercih ediyorum. K.155.[ 1 ]
- ☒ Mekanın fiziksel nitelikleri aktivitelerim için uygun yerler sağladığı için kullanmayı tercih ediyorum. K.156.[ 3 ]

- J7. Bu mekânı kullanıp kullanmama kararını verirken / ya da bu mekânda herhangi bir aktiviteyi gerçekleştireceğiniz zaman aşağıdaki ifadelerin karar vermenizde ne derecede önemli gördüğünüzü söyley misiniz?

1. hiç önemli değil / 2. önemli değil / 3. Ne önemli ne önemsiz / 4. önemli / 5. çok önemli

Dış mekânın sınırlarının belirli / tanımlı olması, çevreleyen binaların giriş katındaki işlevler (kafeterya, kantin gibi yeme içme birimleri), ve bu binalarda kampustaki günlük aktivitelerimin olduğu mekanların olması

| 1                        | 2                        | 3                        | 4                                   | 5                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> K.157. [ 4 ] |

Mekânın fiziksel nitelikleri, yani açığı, çimeni, oturma yerleri, havuzu, yer döşemesi, vb...

| 1                        | 2                        | 3                        | 4                                   | 5                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> K.158. [ 4 ] |

Mekânın görsel olarak çekici olması

| 1                        | 2                        | 3                                   | 4                        | 5                                     |
|--------------------------|--------------------------|-------------------------------------|--------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> K.159. [ 3 ] |

Güzel havanın tadını çıkarmak istiyor olmanız

| 1                        | 2                        | 3                        | 4                                   | 5                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> K.160. [ 4 ] |

Mekânın kampus içinde merkezi bir konumda olması

| 1                        | 2                        | 3                        | 4                                   | 5                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> K.161. [ 5 ] |

Bu dış mekânda diğer öğrencilerle, arkadaşlarınızla rastlama ve iletişim kurma imkanınızın olması

| 1                        | 2                        | 3                        | 4                                   | 5                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> K.162. [ 5 ] |

Bu dış mekânın iyi bir tasarımı düzeninin olması

| 1                        | 2                                   | 3                        | 4                        | 5                                     |
|--------------------------|-------------------------------------|--------------------------|--------------------------|---------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> K.163. [ 2 ] |

Bu mekânda önceden planlanmış aktiviteler katılmak istiyor olmanız

| 1                        | 2                                   | 3                        | 4                        | 5                                     |
|--------------------------|-------------------------------------|--------------------------|--------------------------|---------------------------------------|
| <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> K.164. [ 2 ] |

Dış mekânlarda vakit geçirmeyi seviyor olmanız

| 1                        | 2                        | 3                        | 4                                   | 5                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> K.165. [ 4 ] |

Gelip geçen insanları, akan yaşamı seyretme olanağınızın olması

| 1                        | 2                        | 3                        | 4                                   | 5                                     |
|--------------------------|--------------------------|--------------------------|-------------------------------------|---------------------------------------|
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> K.166. [ 5 ] |

- J8. Bu mekânı daha canlı, yaşanır kılacak ne gibi değişiklikler önerirsiniz?

...Daha fazla bank...sabitli...ya da...mekan...hava...hizmet... K.167. [ 4 ]  
 ...Araçlar için...kurulacak...çekiç...hale...getirebilecek...söğüt... K.168. [ 16 ]  
 ...Sizce... K.169. [ ]

**katkınız için çok teşekkür ederim . . .**

## APPENDIX C: VARIABLE LABELS

### USE by individuals

|                          |                                                                |
|--------------------------|----------------------------------------------------------------|
| Variable labels k0       | individual use                                                 |
| Variable labels k1       | activity diversity by individuals                              |
| Variable labels k1a      | activity alone 1                                               |
| Variable labels k2a      | activity alone 2                                               |
| Variable labels k3a      | activity alone 3                                               |
| Variable labels k4a      | activity alone 4                                               |
| Variable labels k5a      | activity alone 5                                               |
| Variable labels k1b      | frequency of activity alone 1                                  |
| Variable labels k2b      | frequency of activity alone 2                                  |
| Variable labels k3b      | frequency of activity alone 3                                  |
| Variable labels k4b      | frequency of activity alone 4                                  |
| Variable labels k5b      | frequency of activity alone 5                                  |
| Variable labels k6       | specific place for activity alone 1                            |
| Variable labels k7       | specific place for activity alone 2                            |
| Variable labels k8       | specific place for activity alone 3                            |
| Variable labels k9       | specific place for activity alone 4                            |
| Variable labels k10      | specific place for activity alone 5                            |
| Variable labels k11, k12 | reasons for preferring this specific place for activity alone1 |
| Variable labels k13, k14 | reasons for preferring this specific place for activity alone2 |
| Variable labels k15, k16 | reasons for preferring this specific place for activity alone3 |
| Variable labels k17, k18 | reasons for preferring this specific place for activity alone4 |
| Variable labels k19, k20 | reasons for preferring this specific place for activity alone5 |
| Variable labels k21      | number of average visits to the space alone per week           |
| Variable labels k22      | occupancy time of each visit for individual use                |
| Variable labels k23      | total occupancy time of individual use per week                |

### USE by groups

|                      |                                                           |
|----------------------|-----------------------------------------------------------|
| Variable labels k24  | group use                                                 |
| Variable labels k25  | group size                                                |
| Variable labels k26  | number of meetings or get togethers with friends per week |
| Variable labels k27  | occupancy time of each visit in group use                 |
| Variable labels k28  | total occupancy time of group use per week                |
| Variable labels k29  | activity diversity by groups                              |
| Variable labels k30a | activity by group 1                                       |
| Variable labels k31a | activity by group 2                                       |
| Variable labels k32a | activity by group 3                                       |
| Variable labels k33a | activity by group 4                                       |
| Variable labels k34a | activity by group 5                                       |
| Variable labels k30b | frequency of activity by group 1                          |
| Variable labels k31b | frequency of activity by group 2                          |
| Variable labels k32b | frequency of activity by group 3                          |
| Variable labels k33b | frequency of activity by group 4                          |
| Variable labels k34b | frequency of activity by group 5                          |
| Variable labels k35  | specific place for activity by group 1                    |
| Variable labels k36  | specific place for activity by group 2                    |
| Variable labels k37  | specific place for activity by group 3                    |



|                               |                                                                    |
|-------------------------------|--------------------------------------------------------------------|
| Variable labels k38           | specific place for activity by group 4                             |
| Variable labels k39           | specific place for activity by group 5                             |
| Variable labels k40, k41      | reasons for preferring this specific place for activity by group 1 |
| Variable labels k42, k43      | reasons for preferring this specific place for activity by group 2 |
| Variable labels k44, k45      | reasons for preferring this specific place for activity by group 3 |
| Variable labels k46, k47      | reasons for preferring this specific place for activity by group 4 |
| Variable labels k48, k49      | reasons for preferring this specific place for activity by group 5 |
| Variable labels k50, k51, k52 | reasons for being in the space at this moment                      |
| Variable labels k53, k54, k55 | reasons for using the space in general                             |

## **SOCIAL INTERACTION**

|                     |                                         |
|---------------------|-----------------------------------------|
| Variable labels k56 | attributes affording social interaction |
| Variable labels k57 | offering the chance to make new friends |
| Variable labels k58 | meeting friends by chance in this space |
| Variable labels k59 | usually meeting friends in this space   |

## **PHYSICAL FEATURES**

|                      |                                                  |
|----------------------|--------------------------------------------------|
| Variable labels k60a | water fountain                                   |
| Variable labels k61a | greenery                                         |
| Variable labels k62a | steps                                            |
| Variable labels k63a | sculptures                                       |
| Variable labels k64a | ledges                                           |
| Variable labels k65a | benches                                          |
| Variable labels k66a | pedestrian pathways                              |
| Variable labels k67a | pavement                                         |
| Variable labels k60b | satisfaction degree with the water fountain      |
| Variable labels k61b | satisfaction degree with the greenery            |
| Variable labels k62b | satisfaction degree with the stairs              |
| Variable labels k63b | satisfaction degree with the sculptures          |
| Variable labels k64b | satisfaction degree with the ledges              |
| Variable labels k65b | satisfaction degree with the benches             |
| Variable labels k66b | satisfaction degree with the pedestrian pathways |
| Variable labels k67b | satisfaction degree with the pavement            |
| Variable labels k68  | perceived privacy                                |
| Variable labels k69  | feeling close to the natural environment         |
| Variable labels k70  | finding shaded spaces easily                     |

## **ENCLOSURE**

|                     |                                                                                    |
|---------------------|------------------------------------------------------------------------------------|
| Variable labels k71 | enclosing the space by buildings                                                   |
| Variable labels k72 | surrounding the space by trees                                                     |
| Variable labels k73 | feeling in an enclosed space                                                       |
| Variable labels k74 | façades of enclosed buildings that are able to give clues about interior functions |
| Variable labels k75 | easy vision from the interiors to the exteriors                                    |
| Variable labels k76 | easy access in and out                                                             |
| Variable labels k77 | adequate connections between internal & external spaces                            |
| Variable labels k78 | suitable entries and exits into and out of the buildings                           |
| Variable labels k79 | ground floor functions and their fusion to the exteriors                           |
| Variable labels k80 | use frequency of cafeteria/ canteen per week                                       |

|                     |                                                 |
|---------------------|-------------------------------------------------|
| Variable labels k81 | use frequency of classes per week               |
| Variable labels k82 | use frequency of photocopy center per week      |
| Variable labels k83 | use frequency of conference room per week       |
| Variable labels k84 | use frequency of exhibition hall per week       |
| Variable labels k85 | use frequency of library/ reading hall per week |
| Variable labels k86 | use frequency of laboratories per week          |
| Variable labels k87 | use frequency of the cinema per week            |
| Variable labels k88 | use frequency of student club rooms per week    |

## **VISUAL/AESTHETIC QUALITIES**

|                      |                           |
|----------------------|---------------------------|
| Variable labels k89  | attractive-unattractive   |
| Variable labels k90  | repelling-inviting        |
| Variable labels k91  | comfortable-uncomfortable |
| Variable labels k92  | beautiful-ugly            |
| Variable labels k93  | tense-relaxed             |
| Variable labels k94  | ordinary-unique           |
| Variable labels k95  | attractive                |
| Variable labels k96  | inviting                  |
| Variable labels k97  | comfortable               |
| Variable labels k98  | beautiful                 |
| Variable labels k99  | relaxed                   |
| Variable labels k100 | unique                    |
| Variable labels k101 | unattractive              |
| Variable labels k102 | repelling                 |
| Variable labels k103 | uncomfortable             |
| Variable labels k104 | ugly                      |
| Variable labels k105 | tense                     |
| Variable labels k106 | ordinary                  |

## **CONTEXT**

|                      |                                                          |
|----------------------|----------------------------------------------------------|
| Variable labels k107 | shaded spaces as a result of the location of buildings   |
| Variable labels k108 | easy accessibility of the space on the whole campus      |
| Variable labels k109 | being on the path for everyday circulation on the campus |
| Variable labels k110 | central location of the space on the campus              |

## **SPATIAL LAYOUT**

|                      |                                            |
|----------------------|--------------------------------------------|
| Variable labels k111 | like the spatial layout or design of space |
| Variable labels k112 | providing suitable places for activities   |
| Variable labels k113 | perceiving the shape of the space easily   |
| Variable labels k114 | perceiving the size of the space easily    |

## **PLANNED ACTIVITIES**

|                      |                                            |
|----------------------|--------------------------------------------|
| Variable labels k115 | diversity of planned activities            |
| Variable labels k116 | planned activities in the space 1          |
| Variable labels k117 | planned activities in the space 2          |
| Variable labels k118 | planned activities in the space 3          |
| Variable labels k119 | frequency of planned activities per year 1 |
| Variable labels k120 | frequency of planned activities per year 2 |
| Variable labels k121 | frequency of planned activities per year 3 |
| Variable labels k122 | participation in the planned activities    |
| Variable labels k123 | participated activities 1                  |
| Variable labels k124 | participated activities 2                  |
| Variable labels k125 | participated activities 3                  |
| Variable labels k126 | diversity of activities participated in    |

## **PEDESTRIAN MOVEMENT**

|                      |                                                             |
|----------------------|-------------------------------------------------------------|
| Variable labels k127 | easy accessibility through the space                        |
| Variable labels k128 | density of passer byes through the space affords livability |
| Variable labels k129 | like watching passer byes                                   |
| Variable labels k130 | frequency of passing through                                |

## **PERIOD OF TIME**

|                      |                                                           |
|----------------------|-----------------------------------------------------------|
| Variable labels k131 | the most used season                                      |
| Variable labels k132 | the most used period of time over a weekday/or peak hours |

## **USER PROFILE**

|                      |                                    |
|----------------------|------------------------------------|
| Variable labels k133 | age                                |
| Variable labels k134 | gender                             |
| Variable labels k135 | what grade students                |
| Variable labels k136 | length of residency on this campus |
| Variable labels k137 | like being outdoors                |
| Variable labels k138 | like having breaks outdoors        |
| Variable labels k139 | like having lunch outdoors         |
| Variable labels k140 | like spending free time outdoors   |

## **GENERAL EVALUATION**

|                      |                                                            |
|----------------------|------------------------------------------------------------|
| Variable labels k141 | to use space because of its convenience or closeness       |
| Variable labels k142 | to use space because of the surrounding buildings          |
| Variable labels k143 | to use space because of its physical features              |
| Variable labels k144 | having defined boundaries                                  |
| Variable labels k145 | physical features                                          |
| Variable labels k146 | being a visually pleasing, appealing space                 |
| Variable labels k147 | weather conditions                                         |
| Variable labels k148 | being in a central location on the entire campus           |
| Variable labels k149 | having the opportunity to meet friends or others by chance |
| Variable labels k150 | spatial layout                                             |
| Variable labels k151 | participating in the pre-planned activities                |
| Variable labels k152 | like being able to spend time outdoors                     |
| Variable labels k153 | like watching the passer byes                              |
| Variable labels k154 | suggestions for making the space more livable              |
| Variable labels k155 | suggestions for making the space more livable              |
| Variable labels k156 | suggestions for making the space more livable              |
| Variable labels k157 | suggestions for making the space more livable              |

## APPENDIX D: VALUE LABELS

### Value labels of k0

- 0 does not use the space alone
- 1 uses the space alone

### Value labels of k1a k2a k3a k4a k5a k30a k31a k32a k33a k34a

- 1 sitting-resting
- 2 eating-drinking
- 3 studying-reading
- 4 smoking
- 5 waiting
- 6 having a break-spending time
- 7 playing guitar-listening to music
- 8 lying down on lawns-sleeping
- 9 watching people-around
- 10 student clubs activities
- 11 chatting
- 12 sports activities
- 13 selling-buying tickets-magazines-pamphlets on stands
- 14 games
- 15 meeting

### Value labels of k11 k12 k13 k14 k15 k16 k17 k18 k19 k20 k40 k41 k42 k43 k44 k45 k46 k47 k48 k49

- 1 landscape elements
- 2 built elements
- 3 degree of enclosure
- 4 size-spatial layout
- 5 proximity to surrounding buildings
- 6 accessibility
- 7 central location
- 8 scenery
- 9 topography
- 10 on my way
- 11 passer byes
- 12 watching people-around
- 13 planned activities
- 14 aesthetic-visual-sensorial qualities
- 15 weather-climatic conditions
- 16 shaded space
- 17 affective response
- 18 functional response

- 19 sittable space
- 20 other people and friends
- 21 being a well-known-specific place
- 22 just convenient
- 23 visibility
- 24 not crowded and noisy
- 998no answer-no idea

### Value labels of k24

- 0 does not use the space in a group
- 1 uses the space in a group

### Value labels of k56 k57 k58 k59 k68 k69 k70 k11 k72 k73 k74 k75 k76 k77 k78 k79 k107 k108 k109 k110 k111 k112 k113 k114 k127 k128 k129 k137 k138 k139 k140

- 1 strongly disagree
- 2 disagree
- 3 neither
- 4 agree
- 5 strongly agree
- 998 no answer

### Value labels of k50 k51 k52 k53 k54 k55

- 1 sitting-resting
- 2 eating-drinking
- 3 studying-reading
- 4 smoking
- 5 waiting
- 6 having a break
- 7 listening to music
- 8 passing through
- 9 watching people
- 10 students club activities
- 11 chatting
- 12 sports activities
- 13 stands
- 14 games
- 15 seeing and meeting friends
- 16 relaxing
- 17 for pondering about things
- 18 due to the indoor activities
- 19 others



**Value labels k60a k61a k62a k63a  
k64a k65a k66a k67a**

- 1 existing
- 2 none-existing

**Value labels k60b k61b k62b k63b  
k64b k65b k66b k67b**

- 1 very unsatisfactory
- 2 unsatisfactory
- 3 neither
- 4 satisfactory
- 5 very satisfactory
- 998 no answer

**Value labels k89 k90 k91 k92 k93  
k94**

- 1 very
- 2 fairly
- 3 neither
- 4 fairly
- 5 very
- 998no answer

**Value labels k116 k117 k118 k123  
k124 k125**

- 1 protests
- 2 taking graduation photographs
- 3 public address
- 4 stand activities
- 5 spring festival
- 6 shows-performances
- 7 METU alumni day
- 8 meetings
- 10 parties
- 11 football tourney
- 998no idea-no answer

**Value labels k122**

- 0 no
- 1 yes
- 2 passive participation
- 3 sometimes

**Value labels of k131**

- 1 spring
- 2 summer
- 3 does not depend on season
- 998no answer

**Value labels of k132**

- 1 morning <12 a.m.
- 2 noon 12 a.m.-2 p.m.
- 3 afternoon 2 p.m.>
- 998 no answer

**Value labels of k134**

- 1 woman
- 2 man

**Value labels of k135**

- 1 first grade
- 2 second grade
- 3 third grade
- 4 fourth grade
- 5 preparatory class
- 6 graduate student-master and doctorate

**Value labels of k154 k155 k156**

- 1 first degree importance
- 2 second degree importance
- 3 third degree importance
- 998no answer

**Value labels k144 k145 k146 k147  
k148 k149 k150 k151 k152 k153**

- 1 is not important at all
- 2 not important
- 3 neither
- 4 important
- 5 very important
- 998no answer

**Value labels of k154 k155 k156 k157**

- 1 better and more seats
- 2 more greenery and landscaping
- 3 more events/ activities
- 4 water fountains
- 5 built elements (sculptures, movable tables, ramps, bicycle way etc.)
- 6 better pavement
- 7 cafeteria
- 8 changing the vegetation
- 9 keeping the space well-maintained
- 10 more shaded areas
- 11 changes in spatial layout
- 12 more humanistic, warm and attractive architecture-environment
- 13 music
- 998no idea

**APPENDIX E: VIEWS FROM THE VISITED CAMPUS ENVIRONMENTS  
IN TURKEY**

Table E.1. Istanbul Technical University Campus.



Table E.2. Yıldız Technical University Campus

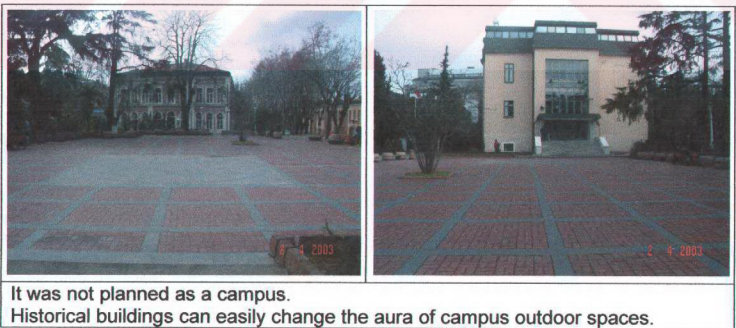
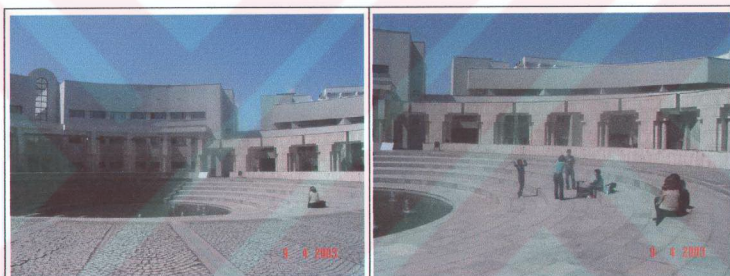


Table E.3. Bosphorous University Campus.



Views from well-used outdoor spaces.  
The outdoor spaces are too big in scale.  
Historical buildings change the visual quality and it was not planned as a campus.

Table E.4. Bilkent University Campus.



Outdoor spaces are surrounded by rich architectural forms.  
However, they do not have sufficient greenery; looks very artificial.

Table E.5. Sabancı University Campus.



Even though the outdoor spaces are enclosed courtyards surrounded by shaded arcades, they are too big in scale and have low use density.

Table E.6. Koç University Campus.





## APPENDIX F: SCATTER DIAGRAMS OF SIGNIFICANT CORRELATIONS

Figure F.1. Correlations between physical features and dependent variables.

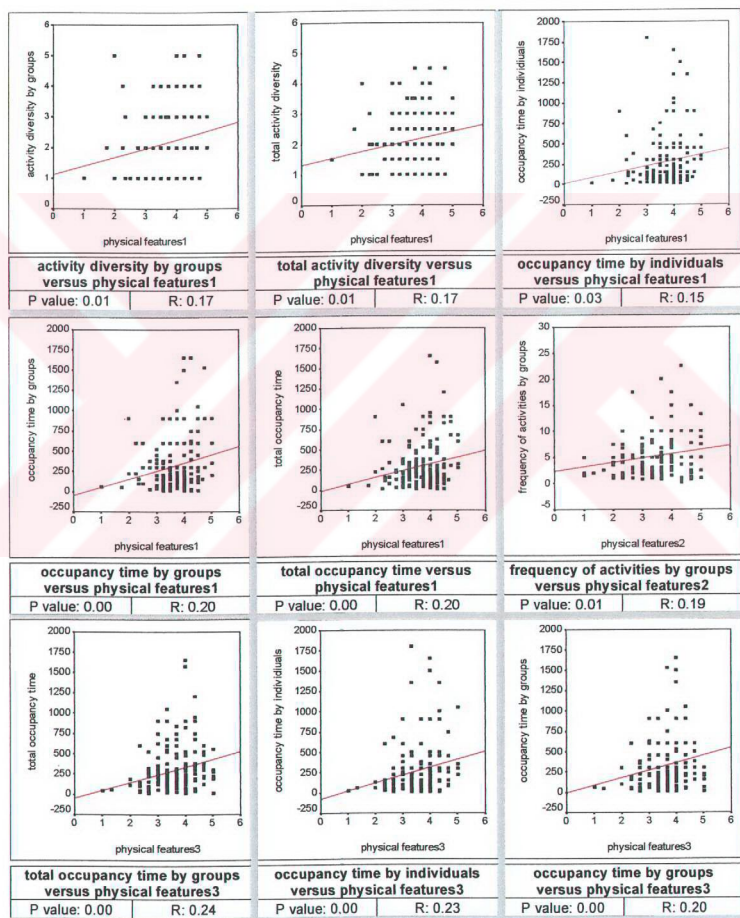


Figure F.2. Correlations between enclosure and dependent variables.

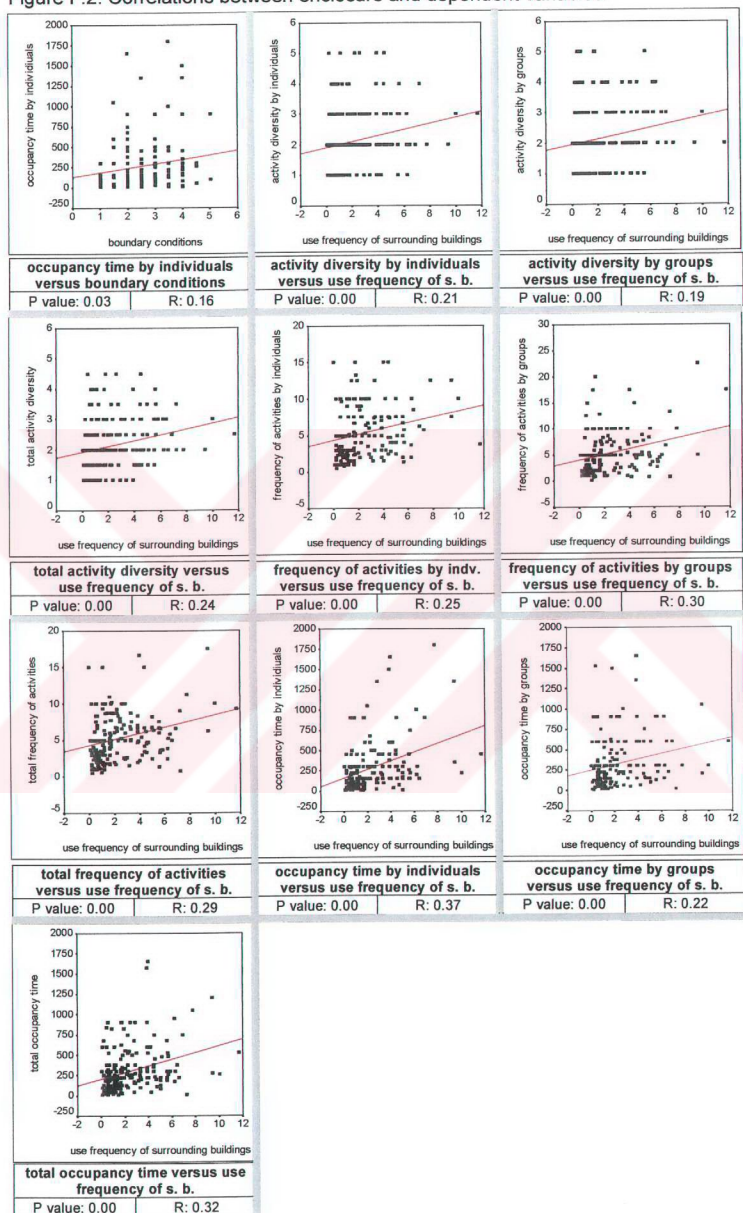


Figure F.3. Correlations between aesthetic-visual qualities and dependent variables.

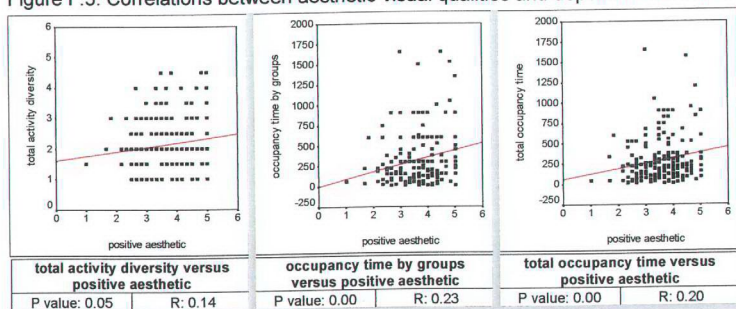


Figure F.4. Correlations between context and dependent variables.

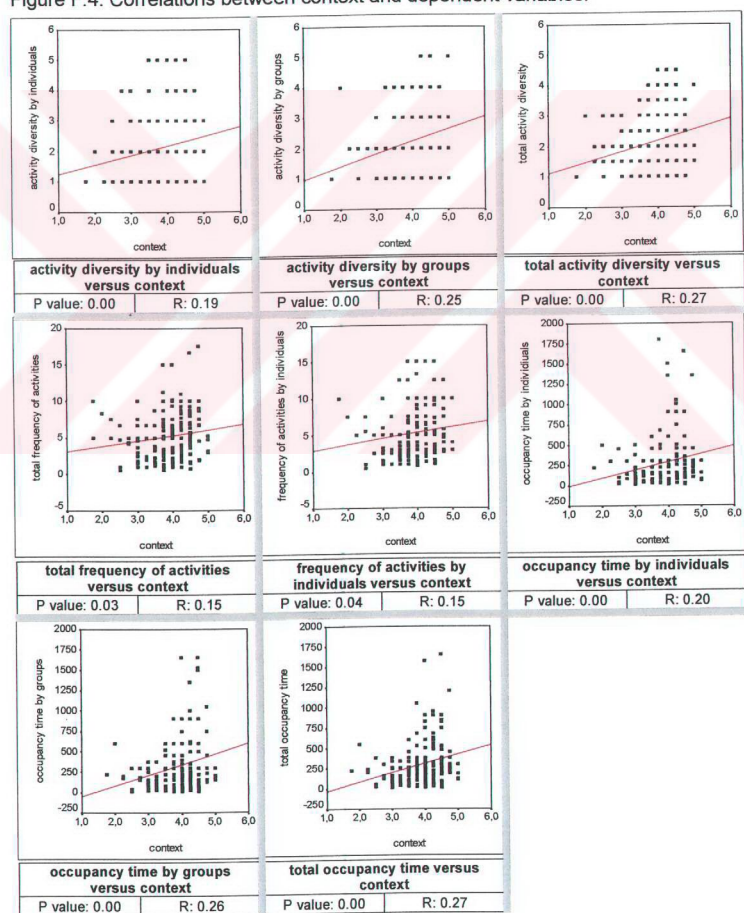


Figure F.5. Correlations between spatial layout and dependent variables.

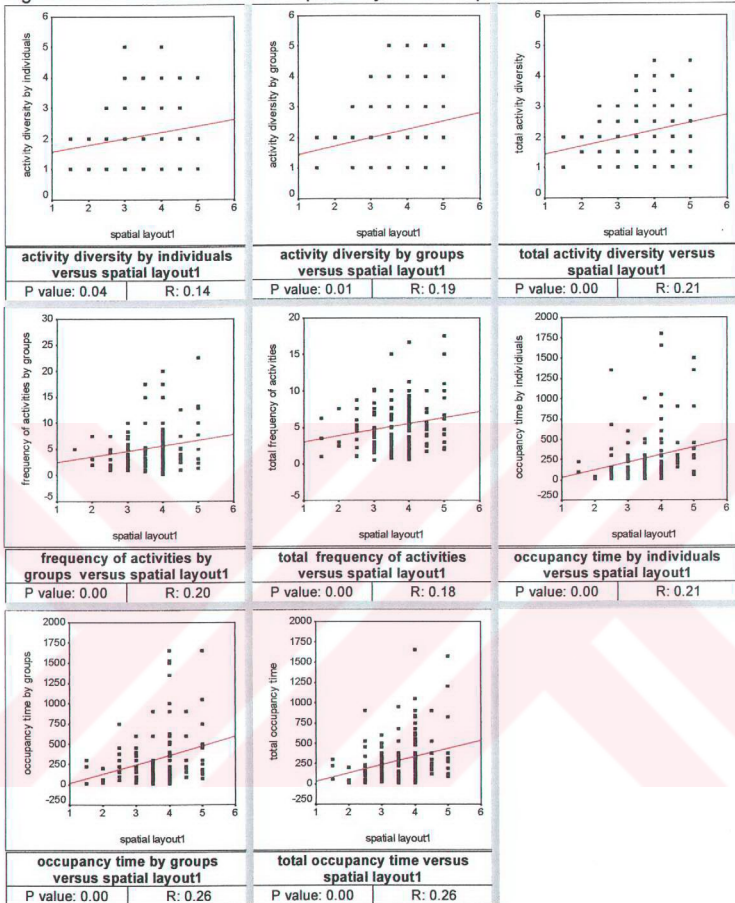
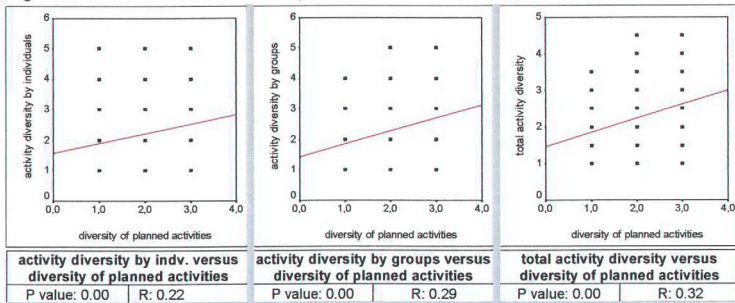


Figure F.6. Correlations between planned activities and dependent variables.





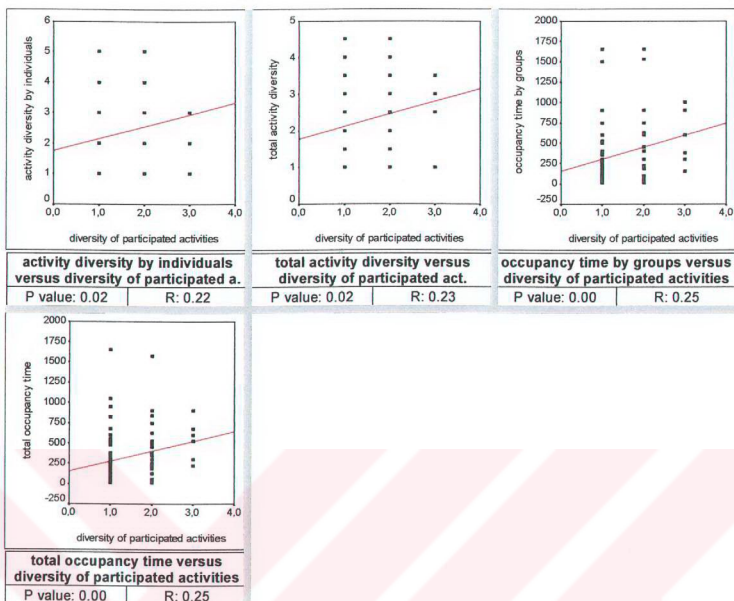
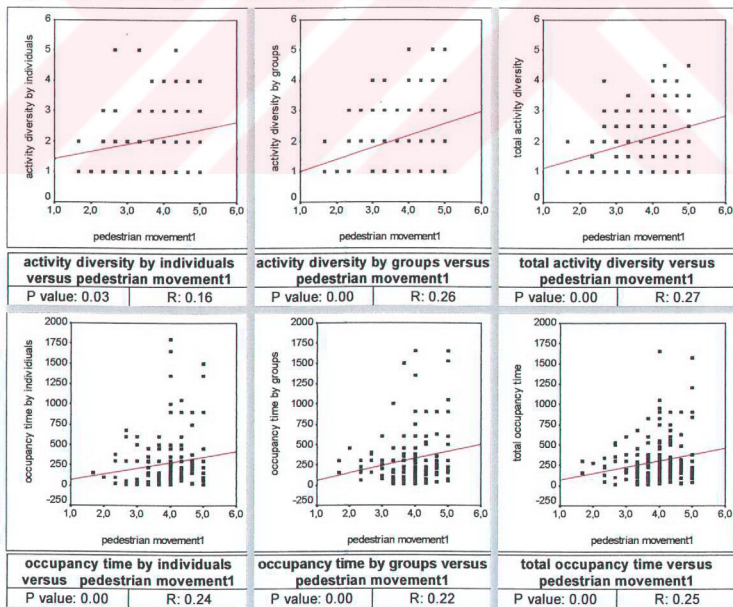


Figure F.7. Correlations between pedestrian movement and dependent variables.



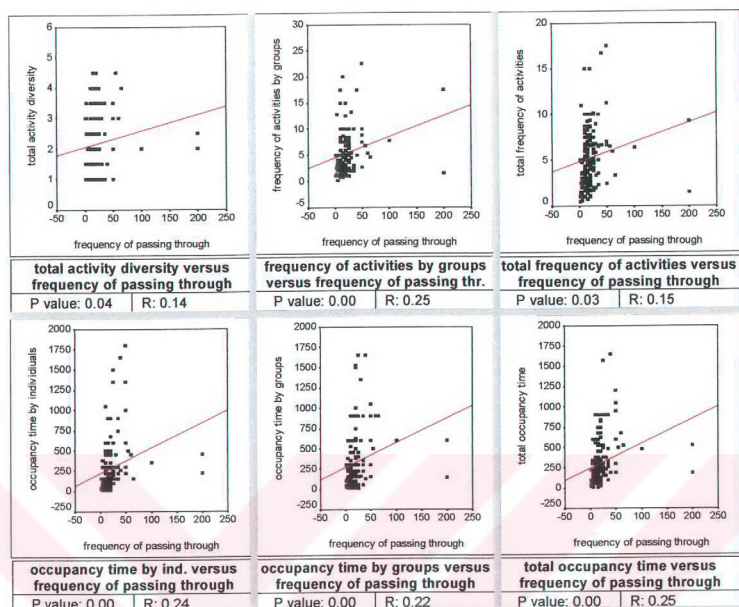
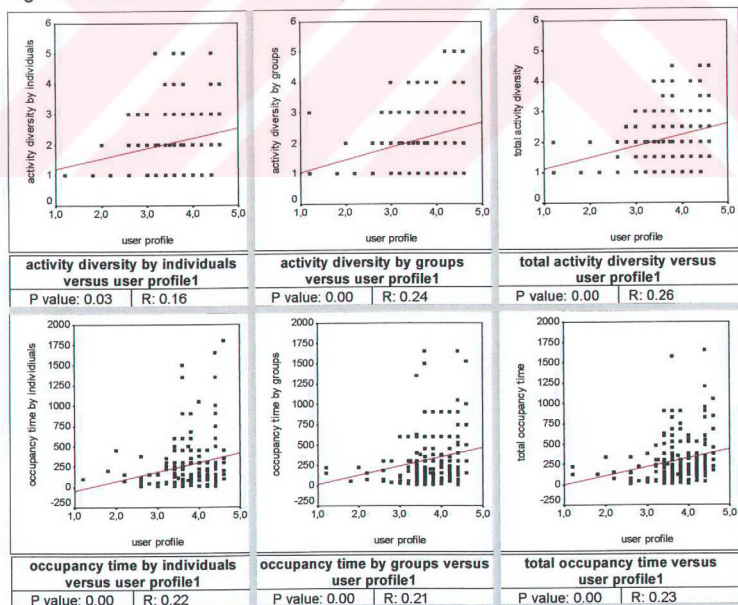
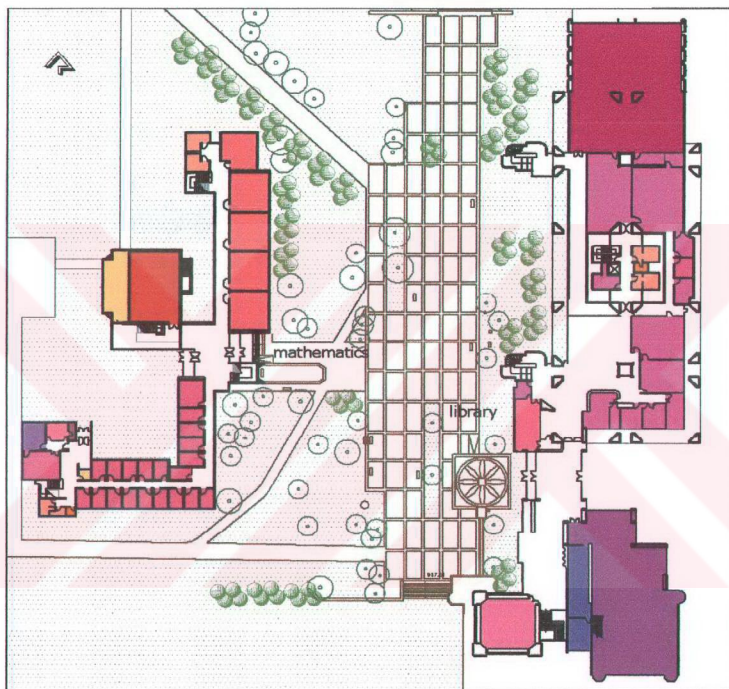


Figure F.8. Correlations between user profile and dependent variables.



## APPENDIX G: GROUND FLOOR PLANS of SURROUNDING BUILDINGS

Figure G.1. Ground floor plans of surrounding buildings in setting A.



### MATHEMATICS

- Meeting Room
- Dean's Office
- Secretary
- Archives
- Lecturer's Rooms
- Classes
- WC
- Cleaning Room
- Canteen

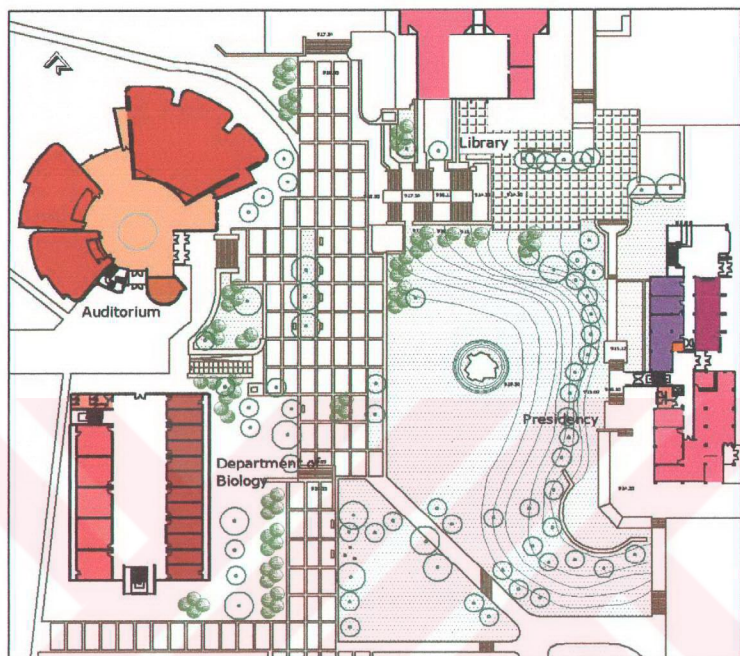
### LIBRARY

- Exhibition Hall
- Short Loan Collection
- Reserve Hall
- Photocopying Center
- Inner Offices
- Reference Collection
- WC
- Cleaning Room

### Legend

0 5 10 15m

Figure G.2. Ground floor plans of surrounding buildings in setting B.



#### AUDIOTORIUM

- Auditorium
- Foyer
- Checkroom

#### LIBRARY

- Offices

#### DEPARTMENT OF BIOLOGY

- Seminar Rooms
- Classes
- WC

#### PRESIDENCY

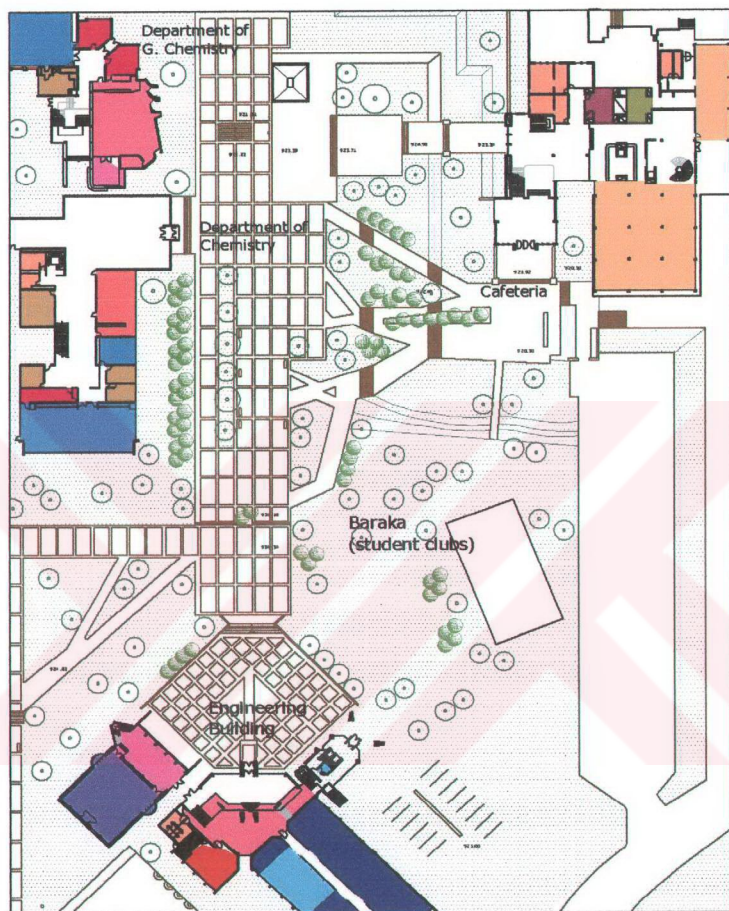
- Offices
- Public Relations Office
- Exhibition Hall
- WC
- Cleaning Room

#### Legend

0 5 10 15m



Figure G.3. Ground floor plans of surrounding buildings in setting C.



**APPENDIX H: 3-D SIMULATION MODELS of SETTINGS**

Table H.1. 3-D Models of Setting A.



Table H.2. 3-D Models of Setting B.

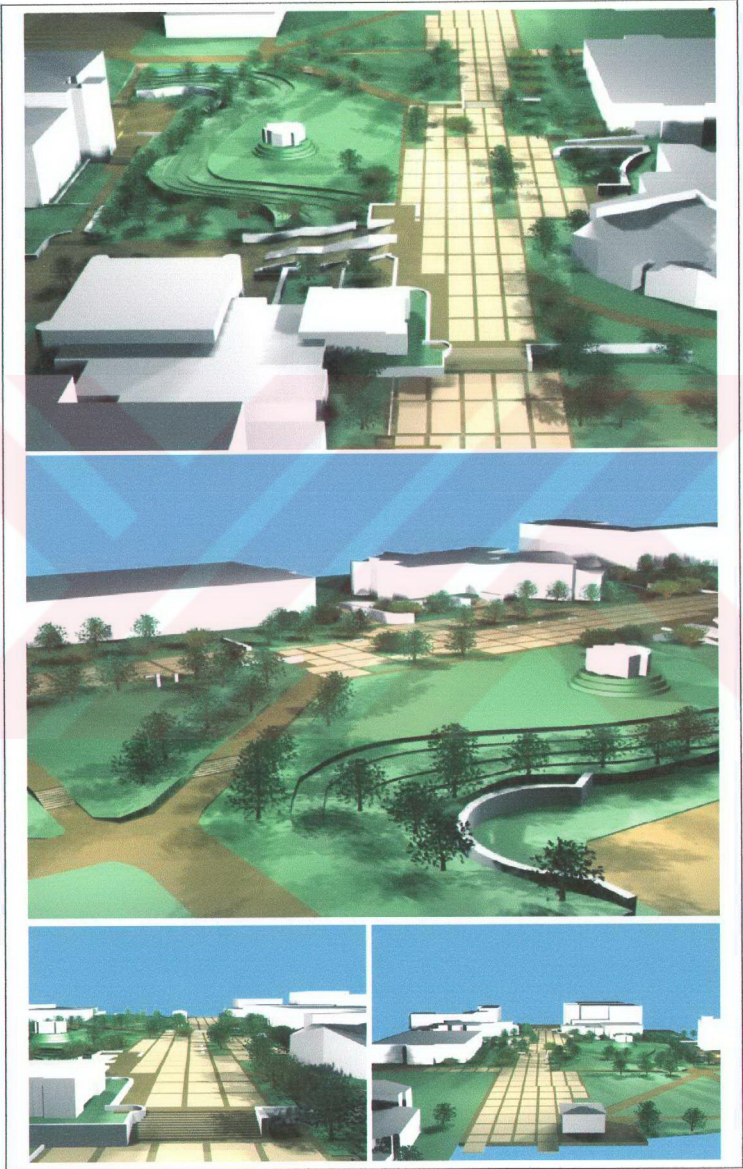
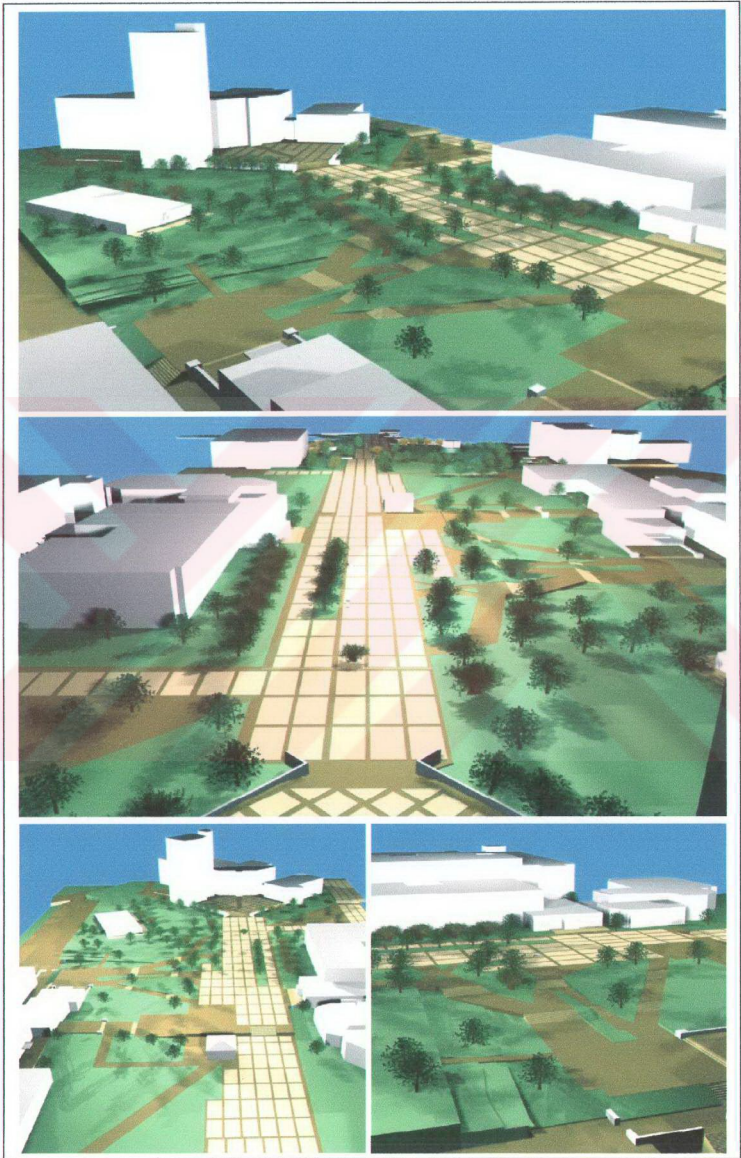




Table H.3. 3-D Models of Setting C.





## CURRICULUM VITA

### Dilek YILDIZ

**Date of Birth** 24.01.1971  
**Place of Birth** Sungurlu/Çorum, TURKEY

#### Education

**Ph.D. in Architecture** Institute of Science and Technology, Graduate School of ITU, Department of Architecture, Architectural Design Programme, Istanbul, 1996-2004.

**Visiting Scholar** North Carolina State University (NCSU), College of Design, 2001.

**M.Sc. in Architecture** Institute of Science and Technology, Graduate School of ITU, Department of Architecture, Architectural Design Programme, Istanbul, 1993-1996.

**Bachelor of Architecture** ITU Faculty of Architecture, Department of Architecture, 1988-1992.

#### Experience

Maintained "Research and Teaching Assistantship" position at Istanbul Technical University since 1995.

#### Honors

Awarded third place for academic excellence upon graduation from Faculty of Architecture (in B.A. degree), summer 1992.

#### Scholarships

- Tincel Foundation's scholarship; supporting short-term research activities abroad for young researches (three months), February-April 2001
- ITU President Office Scholarship; supporting short-term research activities abroad for young researches (five months), May-September 2001

#### Publications

- Yıldız, D., Şener, H., "Factors Affecting the Use Value of Campus Outdoor Spaces", International Conference on "Quality of Urban Life, Policy versus Practice", Istanbul Technical University, Urban and Environmental Planning and Research Center, Istanbul, December 3-5 December 2003, pp.609-621.
- Turgut, H., Yıldız, D., "Culture-Space and Time: The City of Bursa, Turkey", Open House International, Vol. 27, No. 3, 2002, pp. 29-40.
- Rifki, F., Yıldız, D., "Architecture & Landscape: Their Relationship, Interaction and Mutual Effect Explained Through Urban Territoriality", ACSA West Regional Conference, 28-30 September 2001, Manhattan – Kansas State University, Lawrence – University of Kansas, pp. 275-282.
- Sıkıçakar, A., Yıldız, D., "Understanding the City – A Criticism in Relation to Design Studios", Forum II: Architectural Education for the 3<sup>rd</sup> Millenium, Gazimagusa, Turkish Republic of North Cyprus, 22-24 April 1998, pp.267-273.