EFFECTS OF DIFFERENT SEATING ARRANGEMENTS ON LEARNING EXPERIENCE: THE CASE OF MEDIUM SIZED LECTURE SETTINGS IN BILKENT UNIVERSITY

A Master's Thesis

by

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Ankara
June 2014

To my wonderful parents; Metin Hilal and Füsun Hilal

&

My dear friend Eda Paykoç

EFFECTS OF DIFFERENT SEATING ARRANGEMENTS ON LEARNING EXPERIENCE: THE CASE OF MEDIUM SIZED LECTURE SETTINGS IN BILKENT UNIVERSITY

Graduate School of Economics and Social Sciences
of
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IHSAN DOĞRAMACI BILKENT UNIVERSITY
ANKARA

June 2014

I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Fine Arts in Interior Architecture and Environmental Design.

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ABSTRACT

EFFECTS OF DIFFERENT SEATING ARRANGEMENTS ON LEARNING EXPERIENCE: THE CASE OF MEDIM SIZED LECTURE SETTINGS IN BİLKENT UNIVERSITY

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June 2014

The aim of this study is to understand and compare effects of different seating arrangements on attention, concentration, participation and learning satisfaction in medium sized lecture settings in higher education. The study also aims to examine seating preferences in terms of territoriality and personal space. Two types of seating arrangements which are conventional straight row arrangement and U- Shape arrangement were compared. The investigation was conducted in the Department of Interior Architecture and Environmental Design, at Bilkent University. The sample group of the study was same in both seating arrangements. The study was conducted eight times: four times with traditional row arrangement and 4 times with U- shape arrangement. Analysis of physical space, direct and indirect observations and questionnaire were used as techniques. Firstly, the sample group was observed in traditional row arrangement and then U- Shape arrangement. Both lectures and discussion tasks were given to the sample group in both arrangements to understand their effects on students' attention, concentration and participation. In addition to these, while respondents were being observed, photographs and videos were also taken and they were analyzed later. After the observations, a questionnaire was given

to the group and descriptive statistics was done with SPSS 21.0 (Statistical Package for the Social Sciences). It was found that students tend to be more attentive and more concentrated on the lecture in straight row arrangement and they tend to participate more actively in U- Shape arrangement of the lecture room. The observations coincided with the students' perception on these aspects as shown by their responses of the questionnaire. In terms of space use and preferences the research shows that if students want to concentrate more, they seem to choose seats where they are closer to instructor. Finally, it was seen that students tend to be more tolerant in terms personal space when they sit next to their close friends.

KEYWORDS: University education, Learning environments, Collective settings, Seating arrangements, Learning experience, Space use, Personal space, Territoriality Attention, Participation, Interaction.

ÖZET

FARKLI OTURMA DÜZENLERİNİN, BİLKENT ÜNİVERSİTESİNDEKİ ORTA BÜYÜKLÜKTE OLAN SINIFLARDA, ÖĞRENME ÜZERİNDEKİ ETKİLERİ

Hilal, Ümmüşan Selin
Yüksek Lisans, İç Mimarlık ve Çevre Tasarımı Bölümü
Tez Yöneticisi: Yar.Doç. Dr. Maya Öztürk
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Bu çalışmanın amacı, farklı oturma düzenlerinin dikkat, yoğunlaşma, etkileşim ve öğrenme tatmininin yükseköğrenimdeki, orta büyüklükte olan sınıflardaki etkisini anlamak ve karşılaştırmaktır. Bu çalışma aynı zamanda oturma tercihlerini alansallık ve kişisel alan açısından incelemeyi amaçlamaktadır. İki oturma düzeni türü olan; klasik sıra düzeni ve U şekli oturma düzeni karşılaştırılmıştır. Bu araştırma Bilkent Üniversitesi İç Mimarlık ve Çevresel Tasarımı bölümünde yürütülmüştür. Her iki oturma düzenin incelemesine katılan örneklem grubu aynıdır. Çalışma sekiz kez; dört tanesi klasik sıra düzeninde, dört tanesi ise U şekli oturma düzeninde olacak şekilde yapılmıştır. Yöntem olarak, fiziksel mekân analizi, doğrudan ve dolaylı gözlem ve anket kullanılmıştır. İlk olarak, örneklem grubu klasik sıra düzeninde gözlemlenmiş olup daha sonra U şekli oturma düzeninde gözlemlenmiştir. Her iki oturma düzeninde yapılan gözlemler sırasında, örneklem gurubunun oturma düzenlerine karşı dikkati, konsantrasyonu ve etkileşimlerini anlamak için tartışma konusu verilmiştir. Bunlara ek olarak, örneklem grubu gözlemlenirken fotoğraf ve videoları çekilip, daha sonra analizleri yapılmıştır. Gözlemler bittikten sonra, denek grubuna oturma düzenleri ile ilgili anket yapılmıştır. Çalışmanın sonunda, öğrencilerin klasik

oturma düzeninde daha katılımcı ve derse daha odaklı olma, U şekli oturma düzeninde ise daha katılımcı olma eğilimindedirler. Ayrıca, eğer öğrenciler derse daha fazla odaklanmak istiyorlar ise eğitmenin daha yakınına oturmayı tercih ettikleri sonucuna varılmıştır. Son olarak, öğrenciler yakın arkadaşlarının yanına oturduklarında, arkadaşlarının kişisel alanlarına girmesine tolerans gösterme eğilimindedirler.

Anahtar kelimeler: Üniversite eğitimi, Eğitim alanları, Ortak düzenler, Oturma düzenleri, Öğrenme tecrübesi, Mekân kullanımı, Kişisel alan, Bölgesellik, Dikkat, Katılım, Etkileşim.

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CHAPTER I

INTRODUCTION

The transformations of the education systems have started since early 19 th century and this system is continuing to change and develop in 21 st century ever more rapidly (Tuomi & Miller, 2011). In 18th and 19th century, the education system was supporting instructor- based learning which means that students were seen as passive learners and the leader of the course is instructor (Cornell, 1999 as cited in Callahan, 2004). However, a new model of "learning by doing" was proposed by John Dewey and within this students were understood as active learners (Smith, 2002 as cited in Callahan, 2004). This idea of "learning by doing" made a reform in 21th century of understanding education, giving emphasis on the duration and the experience of students of the learning process. So, the notion of learning and education became major components in people's life, and educational systems were being evaluated in terms of whether education should be instructor – based or student- based. In this sense, studying and understanding more about the performance of students in the process of learning takes crucial role. So in practice, instructors are seeking to understand how learning capability of the students can be improved and which teaching styles may help to do that. Students' perception and the learning

environment correlate in various ways. According to researches of learning environments, if educators want to enhance student's performance, classrooms too have to be taken into consideration and designed accordingly (Haghighi & Jusan, 2011). That is to say that there are also physical factors and social factors which affect students' attention, participation, interaction and overall learning satisfaction. The physical/ spatial factors can be defined with all design characteristics of space like size and proportion of the room, acoustics, temperature, light, surface treatments as well as the furniture of the classroom and its arrangement in the space. The social factors are students' personal space, their territorialities, their seating preferences and correlations with others. So in this thesis, seating arrangements of the lecture room are examined as physical factors with respect to concentration, attention, and interaction, as well as with respect to their influence on the social factors such as personal space, territoriality and seat preferences.

1.1. Statement of Purpose

This thesis focuses on how classroom setting, particularly physical arrangement of seating is important in learning experience in collective settings. Two types of seating arrangements - the more conventional straight row seating arrangement and the U-shaped seating arrangement are chosen and compared to figure out the effects of physical seating arrangements on attention, concentration, interaction and students' territoriality, student- student interactions and seating preferences. As a case study, these two arrangements were experimentally applied in medium seize lecture rooms and examined as collective settings.

The major purpose of this study is to explore whether these two different seating arrangements do affect students' learning, attention, participation, interaction, satisfactions as aspects of learning and perception of the students in terms of attention, participation, and interaction. It also includes the observations on students' preferences and practices in using space, discussing how these preferences and practices may be relevant to the aspects of learning. The underlying idea was that while the straight row is most economic and efficient, easy to maintain in order, it does support mainly the lecture type of instruction. It is not supporting other more participatory activities, which are also frequently desired and attempted in collective teaching learning settings. If the research shows differences in the proposed terms, this would suggest that opportunities to equip rooms so as to allow for a variety of arrangements could be proposed.

1.2. Significance of the Study

Although, there are several researches about physical environments of learning spaces; there are no current studies about the effects of different seating arrangements in typical medium sized lecture rooms on learning experience in higher education. Studies about learning environments that investigate seating arrangements reveal that different seating arrangements influence students' learning. However, such studies are generally about schools and concern children who are under 12 years old. So, the question is about the effects of different seating arrangements on students older than 12 and within the system of higher education. One of the studies that concerns has focused only on the effects of seating preferences in different types of

seating arrangement (Kaya and Burgess, 2007). In correlation with student learning there would be single studies on specified learning environments such as one study investigating the effects of different seating arrangements in computer lab classrooms on students' learning- it concerns rooms with specialized equipment (Callahan, 2004). More general settings rarely present a special focus of research. This current study seeks to begin to fill the gap of this specific research topic namely by focusing on the effects of different seating arrangements on attention, concentration, participation as aspects of learning and interaction as well as personal space and territoriality in higher education. The current study is conducted in Interior Architecture and Environmental Design Department in Bilkent University, focusing on typical medium sized general lecture rooms. In this study, two different seating arrangements of the working area were compared which were the straight row arrangement and U- Shape arrangement. In the process of the case study, different techniques such as spatial analysis, direct and indirect observations, and questionnaire were used. The typical medium sized lecture room was chosen because there are some observed problems with the physical environment of the space such as location, size, proportion of the classroom, and fixed equipment like screen and projector.

This current study aims to focus on lecture rooms, which are to accommodate different patterns of teaching. It will investigate the seating arrangements of lecture rooms as learning environments in higher education and analyze their effects on attention, participation, interaction as aspects of learning satisfaction, as well as focus on spatial behavior of students in terms of territoriality according to seating arrangement as aspects of learning experience. The study also aims to see whether

the information which are obtained from the studies about children in terms of learning environments are comparable and applicable in higher education or not.

1.3. The Structure of the Thesis

The thesis is composed of six main chapters. The first chapter is the introduction which sets the study in context and gives brief information about the purpose of the study and its significance. Furthermore, the introduction identifies the overall methodology of the study, literature review, and case study, as well as the research techniques employed in the case study. The introduction concludes with outlining the structure of the thesis.

The second chapter with the title “Learning setting in design and theory” explores literature of learning styles and models in correlation of the learning experience. In the first section, definitions of learning styles and models are given and discussed as to how these affect students’ perception and satisfaction. Furthermore, their correlations what learning experience are discussed. So this chapter aims to figure out how students’ learning style and learning experience are connected with each other and how students’ learning style models are important in terms of attention, concentration and interaction, as aspects of learning experience.

The third chapter studies the literature on the important aspects and characteristics of space such as room size, surface treatments, colors and furnishings, acoustics. Then

it discusses studies on other environmental aspects such as functional organizations in lecture rooms. Finally, studies on seating arrangements and there are examined to identify effects how these may be important students' learning experience. The second part of this chapter focuses on the importance of territoriality and personal space which are explained in general. Then, it examines the importance of territoriality and personal space in learning environments, and discusses whether they affect attention, concentration, participation and interaction or not.

The fourth chapter reviews and discusses similar studies about teaching- learning environments. This helps to identify the contributions of this thesis, and is establish its difference from other studies.

The fifth chapter explains the case study and its aim to examine the physical space arrangement of lecture rooms. It specifies the research questions and hypothesis. Then, the methodology of the case study is described. In the methodology part, the research setting and the experiment as well as the research techniques are explained. Also, it explains the evaluations of methods, statistical analyses and data which are gathered from questionnaire and observations are explained and discussed.

In the sixth chapter, the thesis is concluded with the major results of the study. This includes discussion of the contributions of the study, the limitations which were encountered during study, and suggestions for further research.

CHAPTER II

LEARNING SETTINGS IN DESIGN AND THEORY

The researches about learning styles and learning experience generally started in 1978s and it is holding till now. Therefore, the studies about learning styles and learning experience based on 1978s and the researches which are done later based on the past studies.

2.1. Learning Styles and Models

People receive new information every day during their whole life. It is known that the learning styles of each person differ from each other. Mills states that "we each see the world in a way that makes the most sense to each of us as individuals. This is called perception." (2002). Perception determines people's ideas, decisions, defining and it is also shape people's learning style (Mills, 2002).

Learning is defined in different ways according to researchers. Light and Cox says that learning is a component of whole academic life and it comprises "personal, practical, and social dimensions of students' learning life" (2001, p.63). In addition to these, Kolb says that learning is a process of adaptation which is holistic and "learning is the process of creating knowledge" (Kolb, 1984). It is said that in order to work and manage knowledge successfully in a changing world, the context of learning is defined as an active and meaningful construction of facts, ideas, concepts, theories, and experiences (Light and Cox, 2001).

"Learning style designates everything that is characteristic to an individual when she/ he is learning" (Popescu, 2008). As it is mentioned before, each person differs from each other in terms of how they learn so, people' learning styles differ from each other. Because the topic was researched by several researchers from 1978s to now, there are several definitions of learning styles. In the article which is entitled as "Learning Style and Behavior Analysis Study on the Learning Management System Manhali" (Haddioui, Ismail El., & Khaldi, M., 2012) cited several definitions of learning styles:

- An individual's preferred approach to organizing and presenting information (Riding& Rayner, 1998 as cited in Haddioui& Khaldi, 2012).
- The way, in which learners perceive, process, store and recall attempts of learning (James& Gardner, 1995 as cited in Haddioui& Khaldi, 2012).
- Distinctive behaviors which serve as indicators of how a person learns from and adapts to his environment, and provide clues as to how a person's mind operates (Gregorc, 1979 as cited in Haddioui& Khaldi, 2012).

- A gestalt combining internal and external operations derived from the individual's neurobiology, personality and development, and reflected in learner behavior (Keefe& Ferrell, 1990 as cited in Haddioui& Khaldi, 2012).

Because there are several definitions of learning style in literature, there are also different models of learning. These learning styles are discussed as

- Learning Styles Theory of Kolb (1985);
- Index of Learning Styles of Felder and Silverman (1988);
- Learning Styles of Honey and Mumford (1992);
- Student Learning Style Scales of Grasha (1996);
- Multiple Intelligences of Gardner (1999);
- Auditory Visual Tactile Learning Styles of Sarasin (1998) (Haddioui& Khaldi, 2012).

According to Kolb's theory, learning is various and there are four learning styles where the learner is a converger, diverger, assimilator and accommodator (Kolb, 1984). Also Kolb believe that there are kinds of learning abilities which are Concrete Experience (CE), Reflective Observation (RO), Abstract Conceptualization (AC), and Active Experimentation (AE) (as cited in Barmeyer, 2004) (see Figure 2.1).

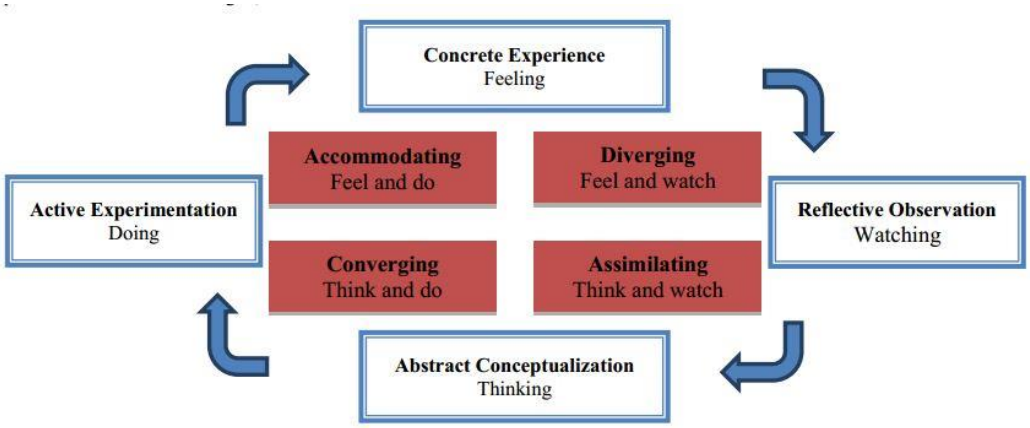

Figure 2.1 Kolb's learning style

From: Learning Style and Behavior Analysis A Study on the Learning Management System Manhali by Ismail EL HADDIOUI and Mohamed KHALDI

According to Kolb, for the people who have converging style (Abstract, Active), the important question is "How?" Convergers have more ability to do in practice, and they are good at while solving problems and making decisions. In the diverging style (Concrete, Reflective), "Why?" is the important question. Divergers have strong ability to observe and they see situations, problems and objects from different perspectives. They also give importance to feelings and people. The assimilating style's learner (Reflective, Abstract) give importance to the question "What?" Assimilators organize information in logical way and they prefer to study on theories and ideas instead of practicing. Finally, for the accommodating style (Active, Concrete) the important question is "What happens if…?" Accommodators prefer manipulation and performing. They take risks and they believe others' ideas instead of their own decisions and analysis. They want to be involved in planning of activities (Kolb, 1984). These learning styles of Kolb summarized in table (see Table 2.1)

LEARNING STYLE	LEARNING CHARACTERISTIC	DESCRIPTION
Converger	Abstract conceptualization +active experimentation	strong in practical application of ideas· can focus on hypo deductive reasoning on specific problems· unemotional· has narrow interests
Diverger	Concrete experience +reflective observation	strong in imaginative ability· good at generating ideas and seeing things from different perspectives· interested in people· broad cultural interests
Assimilator	Abstract conceptualization +reflective observation	strong ability to create theoretical modelsexcels in inductive reasoning· concerned with abstract concepts rather than people
Accommodator	Concrete experience + active experimentation	greatest strength is doing things· more of a risk taker· performs well when required to react to immediate circumstances· solves problems intuitively

Table 2.1 Description of Kolb's learning styles (as cited in Smith, 2001, 2010).

In this sense, Kolb built up a self- description test which is called Learning Style Inventory (LSI). This questionnaire evaluates strengths and weaknesses of learner (Barmeyer, 2004). According to this questionnaire, the people who involved in concrete experience (CE) are more "people oriented." The best way for these people is learning from specific examples by becoming involved. Discussions can be given as an example for CE individuals. Reflective observers are more tentative and reflective towards learning, so these types of learners rely on observation and they prefer to learn from lectures. The people who are in abstract conceptualization (AC) have approach to learn analytically and conceptually. The best way of learning is impersonal learning situations for these types of people. Finally, active

experimentation (AE) individuals prefer experimentation. They learn from projects and they don't like passive learning situations (see Figure 2.2) (Barmeyer, 2004).

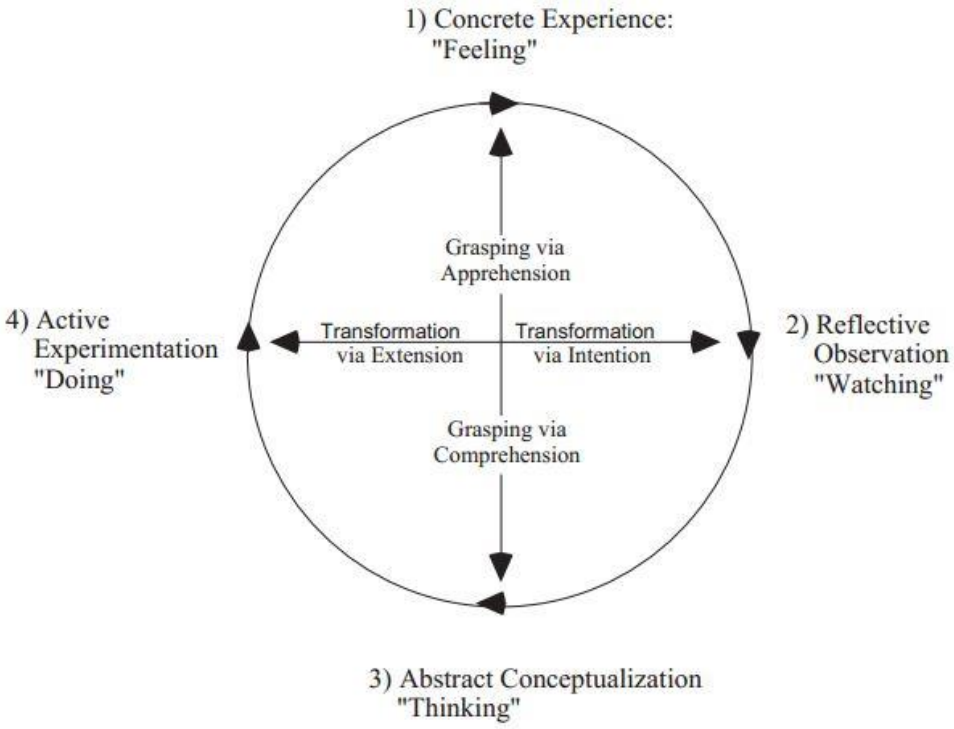

Figure 2.2 The experiential learning cycle.

From: Learning styles and their impact on cross-cultural training: An international comparison in France, Germany and Quebec by C. I. Barmeyer

Furthermore, the issues of which learning styles and how they can be applied in classrooms were addressed by various researchers. Dunn, R and Dunn, K. (1978, 1992a, 1992b and 1986) observed that there are differences between students while they are responding to the instructional material in set environments. Some of students prefer to learn by themselves which mean they want to be alone and some of them like to be in groups or want to learn from the instructor. Dunn and Dunn proposed five key dimensions for student learning styles which are:

environmental, emotional support, sociological composition, physiological, and psychological elements. They summarized them in a table, correlating them with key issues (see Table 2.2). In this sense, instructors should be aware of the students' requests and their learning styles and then apply the teaching method and arrangement of the classroom as wells as overall design of the learning space.

Dimension	Elements	Key Questions
Environment	Sound Light Temperature Seating Design	Do students prefer a noisy, busy, well lit, warm environment or a quiet, subdued, cooler environment? Should the learning environment be formal (e.g. desks and chairs) or informal (e.g. pillows)?
Emotional	Motivational support Persistence Individual Responsibility Structure	Do students need a lot of emotional support? Will they persist on learning tasks? Can they assume individual responsibility? Do they need lots of structure?
Sociological	Individual Pairs or Teams Adult Varied	Do students learn best alone or working with someone? How much guidance from adults do they want or need?
Physiological	Perceptual Intake Time Mobility	Is the student an auditory, visual, tactual, or kinesthetic learner? Does the student like to snack while learning? When is the optimal time for learning? Does the student require freedom to move during learning?
Psychological	Global Analytical Impulsive Reflective	How does the learner attack problem, globally or analytically? Does the student jump into problems or pause to reflect before starting?

Table 2.2 Dunn and Dunn' learning style dimensions

From: Dunn and Dunn: School-Based Learning Styles

With respect to the correlation between learning style and setting, Dunn, R. and Dunn, K. think that although learning styles may differ from person to person, teachers should give importance to design of classroom and make changes according to learning styles to be beneficial for students (Dunn& Dunn, 1978). The design of classroom with possibilities for change includes for instance the location of partitions which help arrange the classroom creatively, applying students' ideas about design of the classroom, light, temperature, sound and seating design. Such changes would be preferred because some students differ from others in terms of ideal place for learning and would want to study in silence. For these kinds of people, spaces should be silent in order to be concentrate on lecture more till others can prefer a loud place and listening music while absorbing information. In addition to these, people also differ from each other qualities of environment such as temperature. Some wants warmer place while others prefer cooler space. Additionally, people respond in different ways to lighting and amount of light. While some people become sleepy in softly light, some of them can prefer this type of light. Finally, Dunn and Dunn say that seating arrangement is also important to learning process. Some people prefer traditional seating units, some prefer open classroom design. Furthermore, some people prefer to study in informal physical environment like couch or lounge chairs; however, others prefer desks and hard chairs (Dunn& Dunn, 1979). So, while classroom is designing, the learning styles of individuals and students preferences in terms of light, temperature, sound and seating design should be taken into consideration.

2.2. Learning Experience

Learning is defined as “changes in behavior that result from experience” (Houwer, et. al., 2013). Also, as it is mentioned in section 2.1, learning is a component of whole academic life and it comprises “personal, practical, and social dimensions of students’ learning life” (Light& Cox, 2001). Learning experience signifies that all interaction, course, program and other experiences in which learning take place” (Learning Experience, 2013).

As mentioned above, Kolb developed a theory which name is Experiential Learning Theory (ELT) and Lewin states that “There is nothing so practical as good theory” (as sited in Kolb& Kolb, 2005, p.193). In the article which is entitled as “Learning Styles and Learning Spaces: Enhancing Experiential Learning in Higher Education” (Kolb and Kolb, 2005) it was noted that there is a synergetic transactions between the people and the environment and learning is a consequence of this synergy. Furthermore, Alice Y. Kolb and David A. Kolb mention about the concept of “learning space” according to learning styles and learning experience. While they introduce the concept of “learning space”, they mention about Kurt Lewin’s field theory and concept of life space. So, they built up their concepts according to Lewin’s theory and concepts. Lewin transformed his concept to mathematical formula and he said that both people and environments are independent variables. Also in this article, it is said that “learning spaces are not necessarily physical environments but constructs of the person’s experience in the social environment (Vygotsky, 1978 as sited in Kolb& Kolb, 2005, p.200).

In addition to these, it is mentioned that the aesthetic characteristic of learning space can be beneficial to improve students' satisfaction in terms of their learning experience (Callahan, 2004). So researchers discuss about how design of learning environments important on learning experience and also they asked that "whether the learner should adapt to the learning environment or whether the learning environment should adapt them" (Lippman, 2010). However Lippman thinks that the better question to ask is how the classroom environment affects students learning experience and how the students have influence on learning environment (2010).

CHAPTER III

LEARNING ENVIRONMENTS AS PHYSICAL AND SOCIAL SETTINGS

For decades, there are several researches about learning environments; such interest began already in the mid-1900s. The researches which were done after mid 1900s were generally based on the foundational study. Fraser said that the researches about learning environments have developed notably since 1968 (1998a as cited in Fraser, n.d.). The meant by this, researchers developed, compared or criticized the first ideas about learning environments. Therefore, this chapter reviews the past decades of literature and integration with current researches.

In 21st century the idea of education system and education spaces have changed and developed in some ways. Instructors have started to give more importance to student based- education. In this way, educators want students who are more active in learning. (Staff, 2008; Kodrzycki , 2002). In this sense, educators not only give importance to their education style but also they have started give importance to

characteristics of physical environment and the social settings of the education facilities (Collins & O' Brien, 2003 as cited in Froyd & Simpson, n.d.) So, we need richer lecture rooms in education environments such as universities so as to have different variation of arrangement for teaching and learning styles.

Lippman states that the environment of classroom shapes students and also students can affect the classroom environment. He also believes that design approach includes the ideology of education, and theory of practice which provides interaction between environment and students (2010). In this situation, he says that if the designers take care about physical setting and social setting, they can make more appropriate classroom design in terms of 21st century needs (Lippman, 2010). The Victorian Institute of Teaching mentions that design of the learning environment architecture will provide effective teaching and it also affects student's achievement (n.d.). However, it is mentioned that there are both positive and negative values in the effects of physical environment in terms of learning and the effects of physical space cannot be evaluated only in achievement. It also affects participation and satisfaction (Rodney, 1991). The effects of the physical environment of learning settings are summarized with a table in the literature review "The Impact of School Environments" (see Table 3.1)

	Furniture and Equipment	Arrangement and Layout	Display and Storage
Attainment	Comfort Better attitude Attainment	Arrangement affects young children's learning; Time on- task changes, which should affect attainment	
Engagement	Comfortable children more on-task; Might need guidance with use of ergonomic furniture	Rows and time on-task; Action zone; Horsehoe Arrangement-more questions	Accessibility-more learning time
Affect	Dislike of standard furniture; Preferences for ergonomic furniture expressed	Rows- fewer negative interactions with teacher-improved attitude; Beautiful room- more positive attitude, more student participation	Accessibility-more learning time
Attendance			
Well-being	Back-ache(Though other factors involved)		Display and open shelving linked to dust allergens

Table 3.1 Physical environment summary.

From: The Impact of School Environments: A literature review (Higgins et.al, 2005)

3.1. Lecture Rooms

In the Design Guidance: Learning Environments, the classroom is defined as "a room used primarily for scheduled classes of multiple academic disciplines with seating capacity of 21 to 199 students" (2003 p. 5). Also it is said that in these rooms seats are oriented, and all students should have writing surfaces (Design Guidance: Learning Environments, 2003).

It is believed that the learning which is gained by experience is more valuable. According to Bakare, knowledge cannot be fully expressed with words and it is subjective and experiential. It is also said that there are difficulties while transferring knowledge, especially while socializing and interacting directly (Bakare, 2012).

In this respect, Wineman states that "the physical environment provides physical facilities and spatial arrangements that aid specific activity patterns" (1986, p.8). It means that lecture rooms can be arranged different ways according to its purpose and so, physical space can be rearranged in terms of needs (Callahan, 2004). So, the question is "what do we need to know about the classroom in higher education settings that will provide designers with some direction to create positive learning environments?" (Scott-Webber, Marini& Abraham, 2000, p.17).

In several studies, it is stated that education spaces should attract the students to make them willing to go to school. So it is said that there should be friendly entrance areas, private places for learners and also color used is important for desirable spaces (Fisher, 2000). This current research does not cover the instructor's performance; however, that is the important to say it is found that there is "a direct relationship between architecture and the collaboration of teachers" (Siegel, 1999). Siegel claims that the arrangement of the classroom has a great influence on social and professional relationships and transformation of the knowledge. So, researchers say that there should be some criteria to create effective learning environment. Because of the idea of effective learning environment, planners started to pay attention more to the

quality of the physical space (Callahan, 2004). Callahan states these criteria in thesis which are:

- Dimensions — room, aisles, ceiling heights, door widths
- Entrances — door location
- Windows — placement, treatments
- Finishes — walls, ceilings, floors
- Furnishings & Equipment — instructor's desk, display surface, student seating
- Voice Amplification
- Acoustics
- Accessibility
- Heating, Ventilation, & Air Conditioning
- Lighting
- Projection Requirements (as cited in Clabaugh et al. 1996).

Owu says that if the designers take care about these design elements, they can improve the quality of physical environment of classroom function (1992). Owu also states that "focus is achieved through the arrangement of architectural elements, proper acoustics and lighting, and the absence of visual distractions" (1992, p.15). Additionally, Maslow and Mintz claim that students in an 'ugly' learning environment make less positive decisions than the students in 'beautiful' learning space (1956).

3.1.1. Spatial Characteristics

As it is mentioned in section 3.1 there are some spatial characteristics which should be applied while designing the classroom environment to create better environment for both students and instructors. According to Jamieson, "adjustable" lecture rooms can provide a diversity of "teacher- centered organizations within the space (2000).

To begin with, room location is should be taken into consideration while constructing the building and designing the learning space. According to Design Guidance: Learning Environments, learning spaces, such as classrooms, should be close to the entrance of the building to provide easy access (2003). Also other researchers say that while arranging the location of the classroom, "ease of student and instructional support access" should be taken into consideration (Classroom Planning Sub-Committee, 2001).

In addition to these, light is another important factor for learning environments. It is said that while locating the lecture rooms, natural light should be also taken into consideration. The rooms which have windows facing north can be designed to accomplish enough "blackout" and "energy efficiency" than the rooms which have windows other directions facing (Design Guidance: Learning Environments, 2003). Additionally, lighting should be enough to take notes, to see instructor and projected images clearly.

According to Classroom Planning Sub- Committee, the design of the lighting should provide limits to glare and it should be configured in "rows parallel to the front wall"

(2001). There should be some fixture properties and it is stated that they should be "1.2 modules with deep cell parabolic lenses with a semi- specular finish (Classroom Planning Sub- Committee, 2001). There should be spot lighting fixtures for the larger lecture rooms, because the lecturer should be visible, and the lecturer should have enough light to read while lighting is configured for visual presentations. In addition to these, there should be illumination of the chalkboards in certain space layouts and this lighting fixture should be set up in to ceiling system and should part of overall design finish (Classroom Planning Sub- Committee, 2001). It is also said that incandescent lighting is not suggested because of it is not energy efficient and not provide enough light levels and light control finish (Classroom Planning Sub- Committee, 2001).

Avoiding noise is also important for education facilities. It is said that classrooms should be separated from internal and external noise sources (Classroom Planning Sub- Committee, 2001) which could affect both instructors lecture and concentration of students. So, classroom should be far away from "drop of areas, traffic parking lots, mechanical rooms, elevators, vending and eating areas and high traffic areas" (Classroom Planning Sub- Committee, 2001).

Acoustic treatment is also important for the lecture rooms to allow both instructors and students to be audible clearly. As it was said one of the most important things is locating the learning space far away from noisy places. According to Classroom Planning Sub- Committee, if the seating capacity is not more than 120, natural acoustics treatment is not needed and learners can hear audible presentations without

disturbed of noises and echoes (2001). Additionally, it is claimed that learning spaces should be designed to supply enough acoustical separation from interior and exterior noise and there are some requirements for acoustics:

50 STC (Sound Transmission Class): Walls, ceilings, floors, movable or folding partitions.

40 STC: Doors and windows near high noise areas.

28 STC: Doors and windows near low noise areas (Design Guidance: Learning Environments, 2003).

According to Design Guidance: Learning Environments, surfaces of lecture room like walls, ceiling and floor should provide useful acoustic (2003). For every sized lecture rooms acoustic is crucial component for the effective teaching- learning environments; however, for the larger one more attention needed (Classroom Planning Sub- Committee, 2001; Design Guidance: Learning Environments, 2003). According to two different guidelines, parallel sidewalls should not be provided and hard surfaces are needed for the front wall. Sound absorbing materials should be provided on ceilings and rear walls (Classroom Planning Sub- Committee, 2001; Design Guidance: Learning Environments, 2003).Finally, surface treatments and colors should be taken into consideration while designing learning spaces. It is known that design of the space or appearance of the space affects directly to room atmosphere. While considering acoustic performance of the lecture room, hygiene should be taken into consideration for the chosen surface treatments. It is said that even if soft materials like carpeting provide good quality of acoustic performance, it

is not preferred because of the hygiene (Design Guidance: Learning Environments, 2003). Low maintenance materials are also preferred and it is said that

- "Hard-surface or resilient flooring with durable surface coatings"
- "Veneer plaster on gypsum wallboard with steel studs"
- "Epoxy coatings or other durable materials on wall areas within reach of people"
- "Sound-absorbing materials located beyond arm reach" should be provided (Design Guidance: Learning Environments, 2003). Furthermore, colors of the surfaces are also important for the learning environments. It is said that finishing colors should be chosen from palettes of University's Interior Color Guidelines. Colors of front side which chalkboard and projection is located should be darker than other sides of the room to get rid of light reflections. In addition to these, it is also mentioned that designer should "avoid use of "cool" colors" in rooms with "warm" finishes, and vice- versa" (Design Guidance: Learning Environments, 2003).

3.1.2. Functional Organizations

Several researches also point out that functional organization of the learning space is crucial for learning experience. It is mentioned that shape and arrangement of the learning space should not prevent the connection of the students with instructors and visual and audible materials (Classroom Planning Sub- Committee, 2001). They also says that if "clear lines of sight" provided from seating units to front side of the room, clear view of instructor and visual material, it would not prevent the connection of students (Classroom Planning Sub- Committee, 2001).

One of the important things is that room size and proportion, and furnishing should be taken into consideration for the functional organization of lecture rooms. The size of learning environments should be adequate for the number of students to seat comfortably. According to ASU(Arizona State University) Classroom Design Guide, clear area should be between 1.8 m^2- 2 m^2 per student (2011).The layouts of the lecture room should be developed during schematic design to determine whether room size and shape provide comfortably accommodation in classroom or not.

Firstly, shape, size of the learning space, and furnishing types of the classroom should be determined, and afterwards other design criteria decisions should be given (Design Guidance: Learning Environments, 2003). Student capacity of the room has crucial role while determining the size of the room. It is said that the room should be square or rectangular for the small rooms and it is stated that "For visual presentation viewing angles are better in a rectangular room with a long and orientation while a square or wide and shallow configuration allows for closer proximity of the course leader to the students" (Classroom Planning Sub- Committee, 2001). In addition to this, it is said that rectangular rooms are not appropriate for the medium and larger lecture rooms because it can affects viewing angle and acoustic performance of the room in bad ways.

Comfort of the seating should be considered while setting first row of seating units. The first line of the seating units should be "twice the height of the projected image from the front wall and the last row of seats should be no more than 8 times the height of the image from the front wall" (Classroom Planning Sub- Committee,

2001). The students who sit at last row of the seats also should be able to see projected items clearly (see Appendix A1, Table A.1 and Table A.2) (Classroom Planning Sub- Committee, 2001).In the Design Guidance: Learning Environments, it is noted that a table which shows space standards and furnishings for the usable area of learning spaces (see Table 3.2 2 and Appendix A, Table A.3) (2003).

SF Per Student	Capacity	Room Type	Furnishings Anticipated
68.6 cm	20	Seminar Rooms	Movable tables & chairs
55.9 cm	32	Classrooms	Movable tables & chairs
50.8 cm	40 or 48		Movable tables & chairs
53.3 cm	60- 99		Fixed writing surfaces & movable chairs
50.8 cm	100- 119		Fixed writing surfaces & movable chairs
48.3 cm	120- 199		Fixed writing surfaces & movable chairs
45.7 cm	200- 299	Auditoriums	Fixed writing surfaces & movable chairs
40.6 cm	300- 399		Fixed writing surfaces & movable chairs
35.6 cm	400- 650		Auditorium seats with tablet arms
101.6 cm	25- 40	Computer Instruction Labs	Computer stations/ conventional monitors
88.9 cm			Computer stations/ thin- profile monitors
88.9 cm- 152.4 cm	varies	Other Instruction Labs	Furnishings and space needs depend on function and discipline

Table 3.2 Space standards and furnishings for lecture rooms.

From Design Guidance: Learning Environments

***SF: Sizes of Furnishing**

Proportion and size of the learning space are one of the major criteria to develop design decisions of lecture rooms. They also affect seating capacity, interaction of students- students, students- instructors, and sight lines directly. It is stated that “To develop learning rooms with good sight lines and efficient seating layouts, design professionals should design from the “inside out”, not from the “outside in” (Design Guidance: Learning Environments, 2003). Therefore, while deciding the design of the room, there are some criteria that should be applied and these criteria which are mentioned below can be also mentioned as spatial characteristic of lecture room.

- The number of screens should be determined according to room type, and teaching style.
- Location and size of the screens should be determined according to seating area.
- The area of instructor should be optimum.
    - There should be enough circulation space between workstation and screen, marker boards and seating units.
    - Instructor area should provide clear view of presented visual on projection to all students (see Figure 3.1 and Appendix A,Figure A.1).
    - The instructor workstations should be near the door (Project PARA).
- Optimum dimensions should be provided for aisles.
- Location and size of circulation should be optimum.
- Finally, walls of the learning space should be decided (Design Guidance: Learning Environments, 2003).

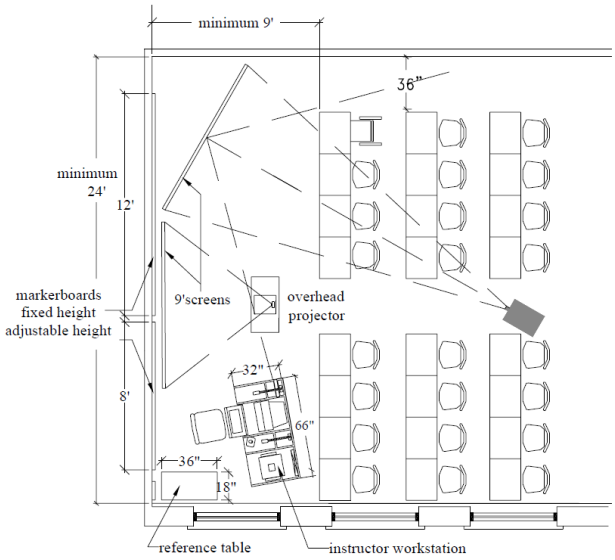

Figure 3.1 The optimum criteria for instructor area.

From: Design Guidance: Learning Environments

Several visuals were supplied in Design Guidance: Learning Environments in terms of impact of proportions of the room on eye contact and sight lines (see Figure 3.2) (2003).

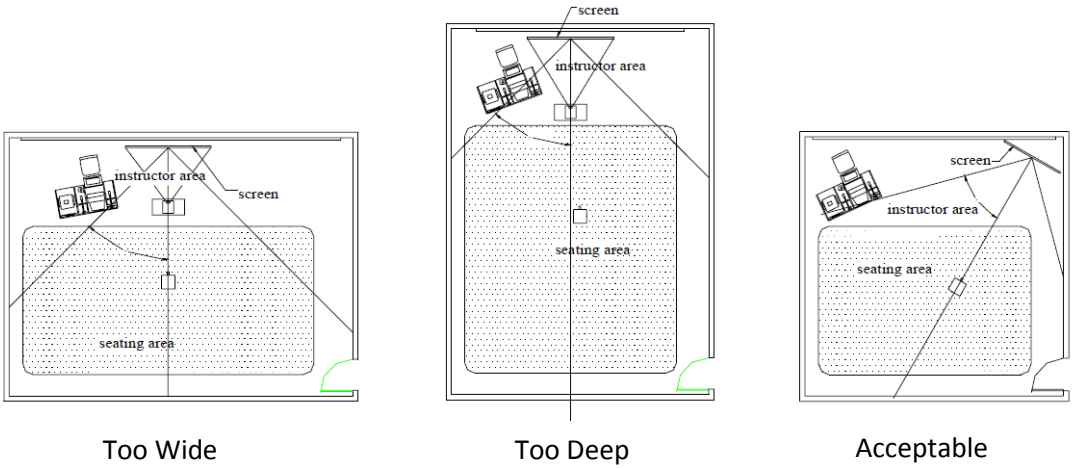

Figure 3.2 Impact of room proportion.

From: Design Guidance: Learning Environments

There are also some standards to provide ideal sight lines to projection screens for lecture rooms. The height of ceilings should be 396 cm from in front of the screen (see figure 3.3 and Appendix A, Figure A.3) (Design Guidance: Learning Environments, 2003).

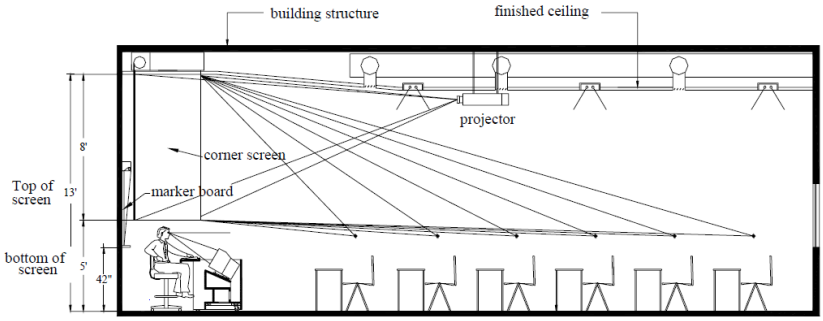

Figure 3.3 Optimum ceiling dimensions

From: Design Guidance University: Learning Environments

With respect to furnishing, it should be said that furnishing should provide enough comfort level and enough writing surfaces for each learner. It should also provide positive appearance for the lecture rooms (Classroom Planning Sub- Committee, 2001). Several surveys were conducted in universities to determine what types of seating and work stations are more beneficial for both instructors and students. In these surveys, various furnishing types were evaluated and according to results of these surveys some decisions were given:

- If the classroom capacity is not more than 48 students, there should be individual desks and movable seating for each learner.
- If the classroom capacity is more than 48 students, there should be "continuous fixed workspace and upholstered movable chairs with adjustable- height seats back" (see Figure 3.4 and 3.5 and Appendix A, Figure A.3) (Design Guidance: Learning Environments, 2003).

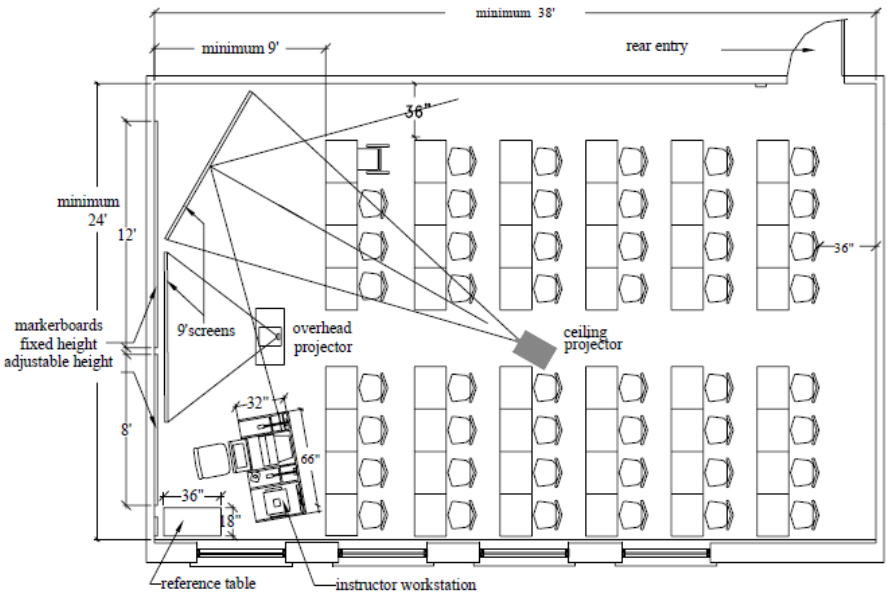

Figure 3.4 Typical floor plan of learning space

From: Design Guidance University: Learning Environments

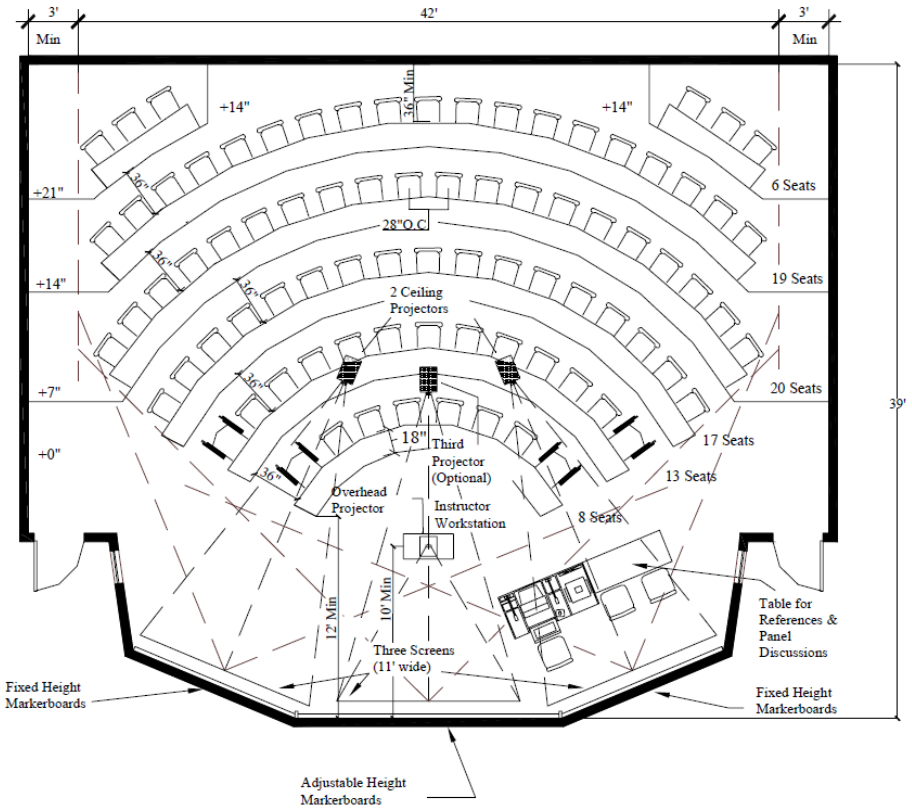

Figure 3.5 Interactive learning space.

From: Design Guidance University: Learning Environments

So, functional organization of the learning environments has great impact on both learning experience and teaching style. If it is needed to summarize, dimensions of room size, instructor area and seating, and furnishing types must be taken into consideration. In addition to these, the organization of the lecture room should provide clear sight lines to see screen, instructor and boards. Students should be faced front side of the learning space. There should be clear aisle between seating units and workstation of instructor to move easily. The area of instructor should be near the entrance of the room to organize materials before lesson start. Accessibility should be well organized and easy access of learning materials should be provided for learners.

3.1.3. Seating Arrangements

Physical environment of the learning spaces has an impact on students' learning experience and their behavior. One of the most significant factors of physical environment is arrangement of the classroom. Lecture room arrangement "refers to how student's seats are arranged inside the class" (Nadeem, Iqbal and Rahman, 2012 p. 13). Arrangement of the classroom can reflect what type of teaching style the lecture is conducted. McNish says that arrangement of the learning space can cause differences in environment and these differences affect student's learning and socialization. Furthermore, with respect to students' participation Dancer and Kamvounias identified five categories which are "student attendance, preparation, and contribution to class discussion, and group and communication skills" (as cited in Nadeem, Iqbal and Rahman, 2012 p. 13).

Nonaka mentions that in higher education the acquisition of knowledge takes place physically and it can be achieved more easily with suitable seating arrangement (as cited in Bakare, 2012). Bakare also believes that seating arrangement supports the creation of knowledge (2012). In addition to these it is claimed that if achievement is wanted in terms of knowledge creation, seating arrangement of learning space should be well organized (Bakare, 2012). Moreover, Nadeem, Iqbal and Rahman believe that to choose which style of seating arrangement is fit in lecture rooms, specific features and importance of particular arrangement must be known. This is so because, seating arrangement styles are significant for classroom management, student-student interaction and socialization (2012). Also, some researchers believe that attentiveness of students increases if the seating arrangement of the lecture room supports the aim of instructor (Haghighi and Jusan, 2011). Therefore, researchers claim that different types of arrangements serve different purposes like lecturing, debating or group working. In addition to this, different types of seating arrangements also affect teaching ability of instructors (Haghighi and Jusan, 2011). Therefore, there are several types of arranging to learning space; however the most common on are the straight row arrangement, the U-shape arrangement, which is also called horseshoe, and the modular or cluster seating arrangement. Each seating arrangement has benefits as well as obstacles too, and corresponds to different teaching/learning patterns.

To begin with, the straight row arrangement is one of the most preferred seating arrangements for learning spaces. McCorskey and McVetta mention in their article that according to researches, 90% of the classrooms in universities have traditional row seating arrangement (1978). The straight row seating arrangement is which

generally occurs by aligning five or six straight rows of students seats and the instructor stands in front of the classroom and facing to students (see Figure 3.6 and Figure 3.7) (McCorskey and McVetta, 1978; Bakare, 2012). In Rosenfiel and Civikly's critical evaluation the straight row seating arrangement as "something like tombstones in a military cemetery" (as cited in McCorskey and McVetta, 1978 p. 100). This points to the strict order where students are single entities and not encouraged to active participation.

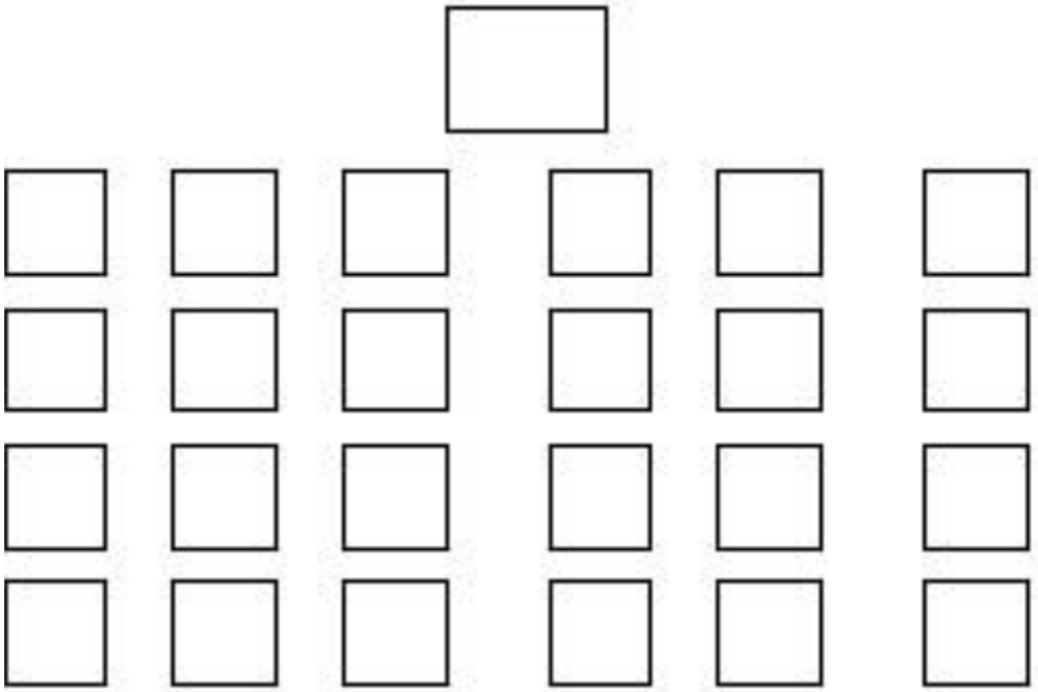

Figure 3.6 Traditional row seating arrangement scheme

From: http://elementaltruths.blogspot.com.tr/2010/08/temperament-and-student-seating.html

Figure 3.7 Traditional row seating arrangement photo
From: http://elementaltruths.blogspot.com.tr/2010/08/temperament-and-student-seating.html

It is said that the straight row seating arrangement provides "one-sided" interaction in the learning space (Bakare, 2012) – i.e. from instructor to students. Furthermore, this seating arrangement provides good environment for lecturing and individual working (Bakare, 2012). Atherton said that traditional row arrangement provides "top-down which means teacher- student approach to learning" as it is cited in the article "Exploring Students Behavior on Seating Arrangements in Learning Environment" (Haghighi and Jusan, 2011).

In addition to these, it is believed that straight row seating arrangement enhances students as passive learners (Haghighi and Jusan, 2011). According to Axelrod, Hall

and Tams, it is found that when students sit in the straight row arrangement they are less prone to talk without permission than in other seating arrangements (1979). Also Wheldall and colleagues (1981) found that on- task behavior is increasing when students sitting in straight row arrangement (as cited in Wannarka and Ruhl, 2008). In addition to these, some researches show that students also ask fewer questions in this arrangement than in other seating arrangements (Wannarka and Ruhl, 2008). Finally, it is said that traditional straight row arrangement generally used in formal education system (Bakare, 2012).

In addition to the most frequently used straight row arrangement, the U-shape seating arrangement is also quite common both in schools and universities. The U-shape arrangement or horseshoe arrangement is generally used in smaller classes, because this type of seating arrangement does not physically apply in larger learning spaces because of "dead space" (see Figure 3.8 and 3.9) (McCorskey and McVetta, 1978, p.100), unless the whole configuration is designed for the purpose such as in larger amphitheatrical lecture rooms.

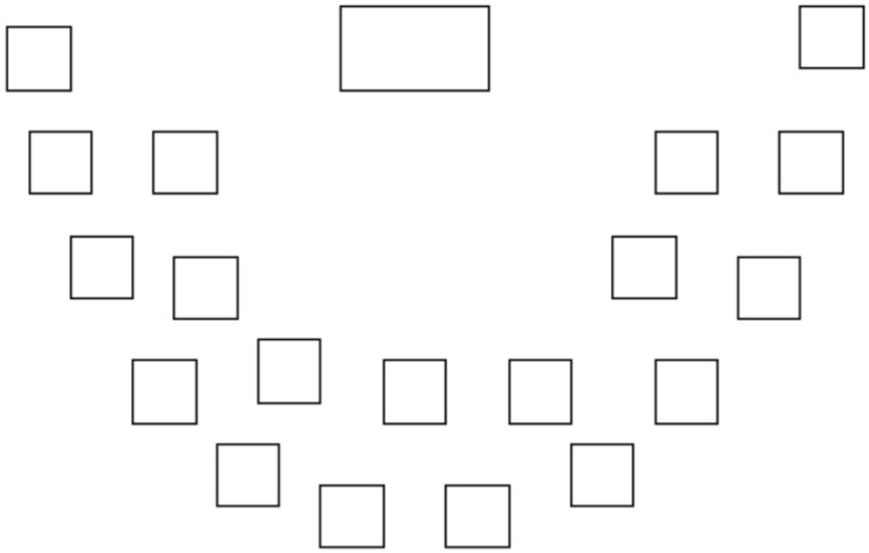

Figure 3.8 U-Shape seating arrangement scheme

From: http://elementaltruths.blogspot.com.tr/2010/08/temperament-and-student-seating.html

Figure: 3.9 U-Shape seating arrangement photo

From: http://allkidscanflourish.blogspot.ch/2010/09/setting-up-new-classroom-got-design.html

Moreover, it is mentioned that providing opportunity to students for talking and interaction which is not only with instructor but also with other students, is crucial to appropriate communicative space (Nadeem, Iqbal and Rahman, 2012). Steinzor observes that in the classroom configured as U-Shape arrangement, students will ask more questions (1950). Additionally, another researcher believes that students would tend to become active learners when they sit in U-Shape arrangement (Atherton, 2005).

As it was mentioned before, the purposes of the instructor are significant while arranging the classroom. So, if the instructor wants interaction, discussion and more participation, then the U- Shape seating should be preferred (Wannarka and Ruhl, 2008; Haghighi and Jusan, 2011; Ammaranas, 2010). The purpose can be also direct instruction or collaborative learning (Ammaranas, 2010). U-Shape arrangement provides working with peers, so this arrangement helps to easy communication with peers and also with instructor. Furthermore, the instructor feels better because of giving equal opportunity for sharing and guiding his/ her students (Nadeem, Iqbal and Rahman, 2012). In U-Shape arrangement, lecturer can also move easily in the center while presenting visual presentations, lecturing and giving homework to students (Hammond, n.d.). The U-shape seating also provides "social interaction" between students (Haghighi and Jusan, 2011 p. 288). In addition to social interaction U-Shape seating is provides good working environment, better interaction between students, better visibility for students and it is also more appropriate if there is a visual and audio presentations (Classroom Seating Patterns, 2003). However, this type of arrangement cannot be applied for larger number of students (Hammond, n.d.). There are also disadvantages of U- Shape seating arrangement. If the instructor

wants to have a meeting with student one by one, she/he can have difficulties because of the seating units are very close to each other (Ammaranas, 2010). Additionally, U-Shape arrangement causes the difficulties to enter to desks and it can affect the isles badly while moving inside of the classroom (Seivert,n.d.; Hammond, n.d.). Finally, it is claimed that attention of students to presented material can be distracted easily (Seivert, n.d.).

Another common seating arrangement is the modular/ cluster seating arrangement. Modular seating arrangement is generally used in special lecture rooms and for students who go to elementary school levels (McCorskey and McVetta, 1978). Clustered seating arrangement is constituted from group of desks around which students sit facing each other. When they need to see the instructor students can turn slightly (see Figure 3.10 and 3.11) (Hammond, n.d.).

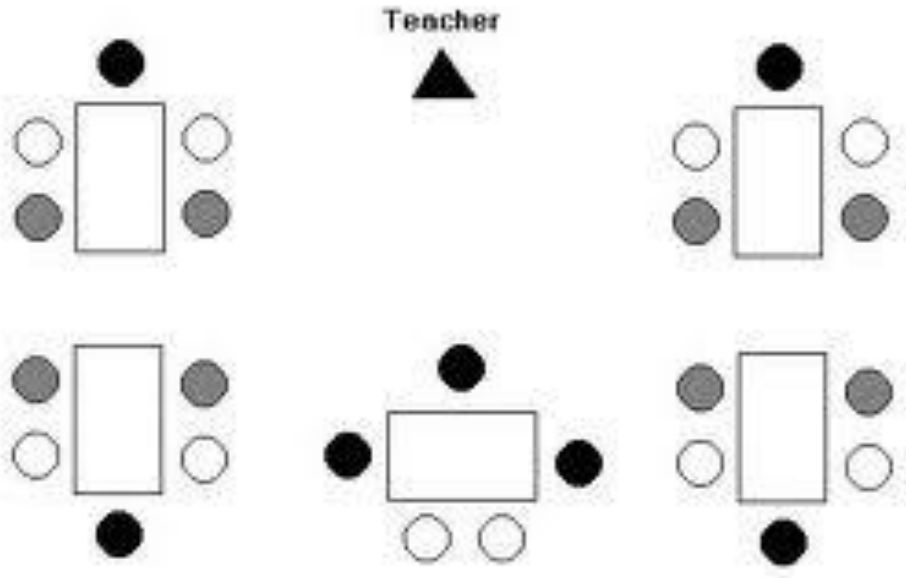

Figure 3.10 Cluster/ Modular seating arrangement scheme

From:http://www.hrepic.com/Teaching/GenEducation/nonverbcom/nonverbcom.htm

Figure 3.11 Cluster/ Modular seating arrangement photo

From: http://www.learnnc.org/lp/editions/classroom-arrangement/6878

Clustered seating arrangement provides a special environment for student-student interaction (McCorskey and McVetta, 1978). This arrangement helps group working and also discussion (Hammond, n.d.). It is believed that cluster seating arrangement encourages both "teacher- centered and student-centered activities" (Ammaranas, 2010). Moreover, students who are more advanced or disruptive can be more easily integrated with grouping in this arrangement. Also, it helps to overcome cultural, racial, gender and social differences by grouping (Nadeem, Iqbal and Rahman, 2012). Cluster seating arrangement also encourages the students to be active like in the U-Shape seating arrangement (Haghighi and Jusan, 2011). In addition to advantages of cluster seating arrangements there are several disadvantages too. When students have exam, they can easily cheat and also there would be difficulties while

instructor giving lecture because learners cannot be oriented and they cannot face with instructor easily.

3.2. Seat Preferences in terms of Territoriality and Personal Space

In addition to the physical characteristics of learning environments, their social characteristics as addressed in environmental psychology are also important for the students' learning experience. These social characteristics in environmental psychology include territoriality and personal space.

Gifford defined the environmental psychology as "the study of transactions between individuals and their physical settings" (as cited in Gifford et al., 2011). So, it is believed that people change their behavior according to environments (Gifford et al., 2011). According to Gifford, there are three research areas to analyze for environmental psychologists. These work areas are:

1. "Perception of environment, spatial cognition, and personality".
2. "The management of social space: personal space, territoriality, crowding, and privacy".
3. "Human interactions with nature and the role of psychology in climate change" (as cited in Gifford et al., 2011, p.440).

Personal space is defined as the space between the individual and others (Sommer, 1959). It is also defined as the area which surrounds the person, and people think that

this surrounding belongs to them psychologically (“Personal space”, n.d.). So, personal space so important for individuals and when it is intruded, people would feel uncomfortable and even angry. The invisible space which is surround people divided into four different zones which are ‘intimate space’, ‘personal space’, ‘social space’ and ‘public space’ (see Figure 3.12) (“Personal space”, n.d.). Sommer states that “people feel uncomfortable when they talk to others who either stand too close or too far away” (Sommer, 1959). This means that although people may feel angry when their personal space is encroached in a public zone, they also feel uncomfortable about disproportional distance while they are talking with someone.

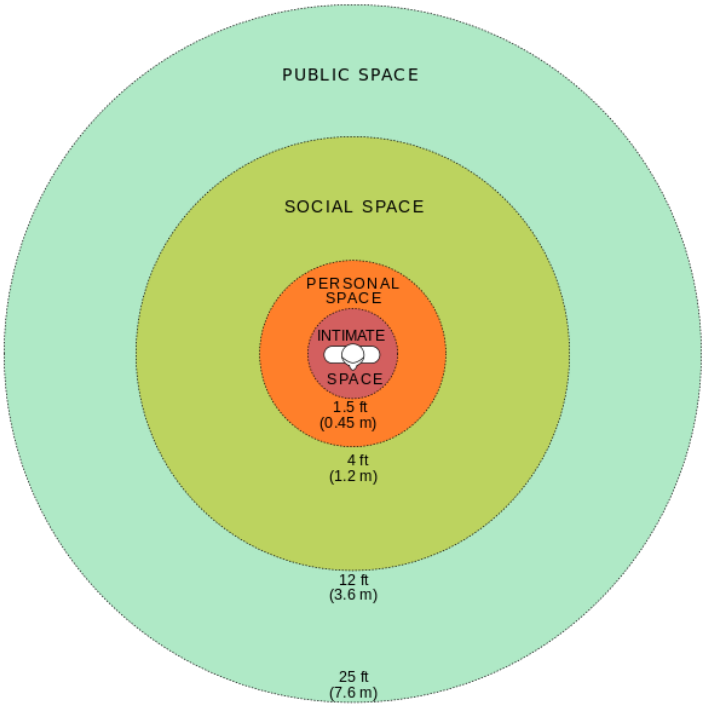

Figure 3.12 The boundaries of intimate, personal, social and public space.

From:http://en.wikipedia.org/wiki/Body_contact_and_personal_space_in_the_United_States

However, building up on Sommer's findings, Gifford proposes that there are definite dimension of personal space, as shown in the figure 3.12. Gifford et al. states that personal space can change according to individuals' culture, preferences or gender, and according to physical settings (Gifford et al., 2011).

In addition to personal space, territoriality is also crucial for people. According to Gifford the meaning of territoriality is understood as

> Territoriality is a pattern of attitudes and behavior held by a person or group that is based on perceived, attempted, or actual control of a physical space, object, or idea, which may involve habitual occupation, defense, personalization, and marking of the territory (2007, p.150).

Altman and Chemers (1980) defined territoriality also as an act that people apply to set and control "social contact" with "territorial" marking (as cited in Kaya & Burgess, 2007). For instance, students put their belongings like books or bags to where they sit to determine their territory. Several researchers say that territoriality also changes according to characteristic of people (Gifford, 2002; Mecer & Benjamin, 1980; Taylor, 1988 as cited in Kaya & Burgess, 2007). For instance, females show less territorial acts than males (Kaya & Weber, 2003).

Although 'personal space' and 'territoriality' seem alike, they are different from each other. One of the most important differences is that while personal space is moving with the person, territoriality is immovable (Sommer, 1959). Also, while the boundaries of personal space are invisible, territoriality is visible (Sommer, 1959).

In this sense, physical characteristic like spatial features of lecture rooms leave influence over students both in terms of personal space and territoriality, they affect seating preferences and learning experience in classrooms directly. The effects of seating preferences and location in term of personal space and territoriality were studied by several researchers previously. Wiles believes that there is a direct relationship between physical settings and the time which is spent in that environment (1978). He also states that there is correlation between personal space and learning experience, so personal space should be taken into consideration in the process of design of the learning environment (Wiles, 1978). Another researcher found that students care less about their personal space when they sit near their close friends (Brody, 1975). Steinzor found that people interact less with people who sit opposite to them than people who sit near them. So, this might be thought as a proof that students sit near close friends, so as to prevent to be encroached their personal space and also to be more interactive (as cited in Sommer, 1961). Furthermore, some researchers claim that according to territoriality which changes from person to person, people chose definite seating (Gifford, 2002; Guyot et al., 1980; Sommer 1969 as cited in Kaya &Burgess, 2007). In accordance, Pedersen (1994) says that the students who want to isolate themselves chose to sit back side of the lecture room (as cited in Kaya & Burgess, 2007). Sommer claims that students who sit in front side and center of the classroom in straight row arrangement and students who sit opposite side of the instructor in U- Shape arrangement show more participation (Sommer, 1969). Kaya and Burgess (2007, p.873) found that

> Students who had more desire to partition their own territory in a classroom setting chose the first seats of each end in a row; students who had less need for a clear definition of their own territory chose middle seats in a row.

In addition to Kaya and Burgess, Stires states that "students who select the front and center seats are brighter and more interested in the course in the first place" (1980, p. 242) and when students chose the back side of the classroom, their participation decreases (Sommer and Ross, 1958; Sommer, 1961, 1967, 1969; Becker et al., 1973 as cited in Montello, 1988).

Furthermore, it is believed that the types of seating arrangement and the preference for individual seating location are correlated with each other and they have great influences on students' learning experience. Hence for instance, U-shape seating arrangement encourages students to ask more question and students who sit front side and center of the classroom have more communication with both other students and instructor (Marx et al., 1999; Montello, 1988).

Therefore, according to correlation of seating arrangement and seating preferences, Adams and Biddle developed their "action zone" theory. Action zone theory suggests that front and center part of the seating arrangement provide more interaction between instructor and learner (Bradova 2012). Marx, Fuhrer and Hartig have studied about two types of action zone which are "T- action zone" and "Triangle action zone" and they found that students who sit center ask more question in both action zones (see Figure 3.13) (1999).

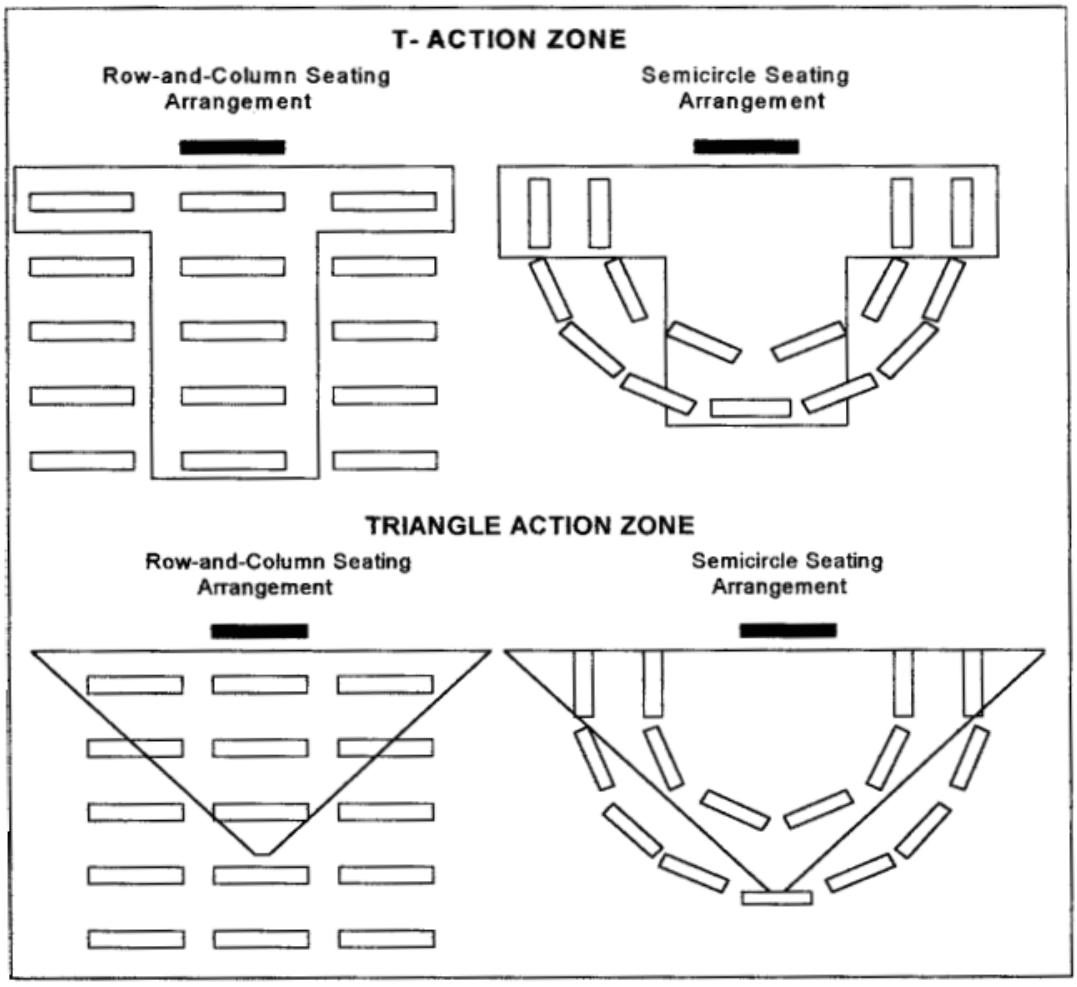

Figure 3.13 'Action Zones' of seating arrangement

From: Effects of Classroom Seating Arrangements on Children's Question-Asking

In addition to these, studying students' attitudes Totusek and Staton- Spicer (1982) found that learners who sit front and center part of the arrangement are more "creative, assertive, aggressive and competitive" than other students (as cited in Marx et al., 1999, p. 251). Moreover, Hillman et al. (1991) say that when students sit front or center, they are more attentive to lecture (as cited in Marx et al., 1999).

3.3. Analogous Studies on Correlations Between Seating Arrangement and Learning Experience

There are several studies about seating arrangements and learning experience and the chosen four similar studies are defined in this chapter.

The first one is a thesis which is entitled as "*Effects of different seating arrangements in higher education computer lab classrooms on student learning, teaching style, and classroom appraisal"* by Callahan (2004). Callahan investigated the physical arrangement of workstations, seating and equipment in computer lab classrooms and its effect on the social and physical settings of the classroom.

Callahan mentioned about teaching methods, learning styles, information technology in terms of higher education as well as physical and social characteristics of learning environments. She compared two different types of seating arrangement in computer labs which are 'row arrangement' and 'pods cross- shaped' arrangement.

As mentioned, the research evaluated two different seating arrangements in computer lab classrooms in terms of student- teacher interactions and their satisfaction of the learning environment. Callahan specifically aims to investigate whether different seating arrangements affect both student and teacher or not. For the methodology researcher used inventory sheet, observation and questionnaire with the 72 students in the department of Sociology and in department of Criminology in University of Florida. She chose two sections per department to compare "the social behavior and

classroom appraisals of the students (Callahan, 2004). In addition these, the observation took six weeks period. At the end of the study, Callahan found that physical and social settings are connected with student learning and teaching style.

Secondly, Bakare made a research about the "*Effects of seating arrangement on methodology in adult education classes in Lagos, Nigeria: implication for knowledge creation and capacity building"* (2012). Bakare tried to explore the link between the seating arrangement and choice of teaching method in terms of knowledge creation.

Bakare, focused on 'knowledge creation' and 'capacity building'. Bakare aimed to figure out whether seating arrangements are important for adults in higher education in these respects. The researcher claims that all possible seating arrangement types contribute to different teaching techniques and learning situation; so, there is no exactly 'right or wrong' seating arrangement (Bakare, 2012).

As a research method, Bakare's study uses questionnaire and observation in over 300 education centers in Lagos State. While research was conducted, Bakare used "proportionate sampling technique" and chose 132 different adult per center randomly. Bakare found that seating arrangement has an effect on teaching method and learning; seating arrangements determine the method of the teaching.

In the article entitled *"Territoriality: Seat preference in different types of classroom arrangements"* Kaya and Burgess (2007) explore the relationship between

territoriality and seating preferences in different types of classroom layouts. This article also investigates the relationship between gender and territoriality.

Kaya and Burgess tried to establish a link between "degree of territoriality as a function of students' preference and gender" (Kaya& Burgess, 2007). So, they claimed that tabled desks support behavior of territory and they also said that territorial behaviors may show difference in terms of "individual characteristics" of people.

As a research method, they used questionnaire as technique in large public institutions in USA. Sample group was 100 faculty members from different disciplines and they focused on two groups in different classroom arrangements which are tabled desks in row arrangement, cluster seating arrangement and U-Shape arrangement. The physical characteristics of the classroom such as size, number of desks, and location of door and windows, were similar with each other. At the end of study, they analyze results as "identification of territorial behavior dimensions, seat preferences in classroom layouts, and identification of high and low territorial seats''. They found that the choice of seating depends on which ones the students "perceive as being easier to claim and defend when invaded by another student" (Kaya& Burgess, 2007). Also, they found that students who sit at the end of rows have higher scores and students who sit at the end of rows more need to define own territoriality than others. No significantly different results are found in the U-Shaped and cluster layouts.

The final study is "*The effects of learning styles and gender on the academic performance of interior architecture students"* by Demirkan and Demirbaş (2010). The aims of this investigation is focusing on education of interior architectural design in the design studio by highlighting the learning style dimensions and they also focused on design education using 'Index of Learning (ILS) and explored the effects of learning styles and gender on the performance scores of design students. The research questions of this research are:

1. "What is the learning style distribution of senior interior architecture students in four learning scales?"
2. "Are there any significant differences in the performance scores of senior interior architecture students across learning styles and gender?" (Demirkan &Demirbaş, 2010, p.1391).

In this research, they claimed that 'self- reflection' is the one of the most important learning experience in the design studio situation. They analyzed this research in the way of 'active/reflective' and 'sensing/intuitive', 'active/reflective' and 'visual/ verbal' and 'active/reflective' and 'global/ sequential scales in terms of academic performance with respect to design studio learning.

As a research method, 'index of learning styles' were used to figure out learning styles of students. The sample group was composed of 100 students from IAED (The Department of Interior Architecture and Environmental Design) in Bilkent University. The age of sample group was between 19 and 27 and also 75% of the students were female and research was done in design studios.In the research they

found that learning styles and gender were independent on each other and also, ‘Active/ reflective’ scale is the most dominant scale in design studio education.

CHAPTER IV

CASE STUDY: MEDIUM SIZE LECTURE ROOMS AT BILKENT UNIVERSITY

4.1.Aim of the Study

The purpose of this investigation is to understand and compare effects of different seating arrangements on attention, concentration, interaction as aspects of learning satisfaction in medium sized lecture settings. The study also aims to examine seat preferences in these arrangements in terms of territoriality and personal space. So, two types of seating arrangements which are the straight row arrangement and U-Shape arrangement are being studied comparatively.

4.1.1. Research Questions

The principal research questions of the investigations are:

1. How are students affected by different seating arrangements in lecture rooms?

2. Does seating arrangement affect attention, participation, interaction, satisfaction as aspects of learning?
3. What are the prevailing attitudes to use of space with respect to these two types of arrangements; ‘the regular straight row’ and ‘U-shaped’ lecture room configuration in terms of

    Seating preferences

    Personal space

    Positioning in collective settings

4.1.2. Hypothesis

The hypotheses of the investigation are:

1. Traditional straight row lecture room is more efficient with respect to concentration, attention and self- perception as individual.
2. U- Shape lecture room is more efficient with respect to participation, interaction and group working.
3. Students show two districts for seating preferences in terms of learning and personal space in both arrangements;

    If the students want to be more concentrate on lecture, they choose to sit directly opposite side of the teacher.

    If the students feel stricter about territoriality, they choose to sit edge part of the arrangement.

4.2.The Methods of the Case Study

As it is mentioned before, the purpose of this study is comparing the effects of two types of seating arrangements which are *straight row lecture room* and *U-shape lecture room*. It aims to identify how the seating arrangements affect attention, participation, interaction, and satisfaction as aspects of learning, as well as figure out seat preferences. Both qualitative and quantitative methods were used for the case study. The two different arrangements were examined with several research techniques, seeking to compare results from analysis and observation as to possible differences, with the students' perception of such differences. Firstly, the lecture room was analyzed as a research setting as physical space, identifying its principal properties and potentials. Secondly, several research techniques such as documenting, direct observation and a questionnaire were used to gather data. These were than compared and evaluated in the discussion part.

Beyond the descriptive analysis of the given space, one of the main research techniques is the observation of the teaching/learning setting as it develops in the two different arrangements that were organized experimentally. It includes observations of student-student interaction, students- teacher interaction, participation of the students, attention of the students and behaviors of attitudes for both of the compared arrangements in terms of different forms of shared setting. The second research technique applied is questionnaire; By way of a series of questions to the students it is to reveal the students' perceptions and their evaluation of the physical setting, as to the aspects under research for each of the different arrangements. Their responses

were to be based on their experience of these in experimental re-arrangement, and on their comparison of the perceived effects of these different seating arrangements, the qualities of the classroom in correlations with learning experience.

4.2.1. Research Setting of the Case Study

4.2.1.1. Sample Group

The respondents of the study were chosen from Interior Architecture and Environmental Design Department in Bilkent University in Ankara. The sample group consists of 26 students from 'FA 171 Art and Culture I' spring semester (2014) class. In this course, students are mostly in their first year, and their first time in Art and Culture I class, and the mean of ages is 20.08. Because the majority of the participants were female (76, 9 %) the current study did not focus the gender and age differences (see Appendix B, Table B and Table B.2).

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4.2.1.2. Analysis of Middle Sized Typical Lecture Room as Physical Space

The investigation was conducted in the Department of Interior Architecture and Environmental Design, at Bilkent University, choosing to study one of the regular medium sized lecture rooms which form the most frequent experience of collective settings for students. The building consists of two wings and four floors. There are four typical lecture rooms per floor; so, there are thirty two classrooms in total. However, some of these classrooms have been arranged for special purposes like computer lab classroom, rooms for presentations with continuous work surface

(two), and equipment for design studio (two). The rest of the spaces are equipped and used for classes of different sizes of groups, holding up to 50 seats /workstations on average.

For this current study, FF 102 lecture room was chosen. The measures of the room are 11, 0 X 5.65 m and ceiling height is 3.71 m; so, the total area is 62.15 m^2. It forms an elongated rectilinear space, with entrance in the corner of the narrow side, in this case at the right. There are two windows which are back side of the room and left side (opposite of the door) of the room and two solid walls (see Figure 4.1). The room takes natural light from both windows; however, the daylight coming from the window which is located in left side of the room is very poor (see Figure 4.1). So, the main source of the natural light is back side of the window in determined day time; however amount of light is not enough for learning space. Therefore, artificial light which is solved with fluorescent lighting fixtures on the ceiling is provided for appropriate light conditions. The both windows provide good ventilation for classroom. The walls of the room are painted in white. Also ceiling is painted in white. Floor is covered with 30X30 terrazzo tiles. Acoustics were not measured; however, the quality of the acoustic is acceptable according to direct observations. In addition to these, the entrance of the room provided from front-right on the narrow side of the space (see Figure 4.1).

With respect to these principal properties this typical class room roughly corresponds to the standards identified in the literature in terms area, proportions and ceiling height, light and ventilation, acoustic properties. There is also appropriate ratio of the

student number (50 individual seats). Also this number is still within the limits (48 students in the regulations) for individual workstations. However, in terms of shape it is a rather elongated rectangular space and rather ‘deep’. This poses problems for using the space in different arrangements.

This typical classroom is equipped with instructor area with computer, projection screen and Power Point transmitter on the narrow side of the entrance. With respect to arrangement of the classroom, it is rather fixed: there is platform which is 15cm height for instructor desk and it is located in left side of the room (see Figure 4.1). The platform is covered with carpet. This furnishing and equipment makes it difficult to try to use the room in different ways. Therefore the lecture room is normally used in the established straight row seating arrangement. This is the only way in which 50 seats can be appropriately fitted into the space and allow proper circulation. The room divided in two group of seating units and there is circulation area between these groups of seating units. There are adequate circulation areas between arm desks and the group of desks which are right side desks group and left side desk groups (see Figure 4.1). The room consists of 54 arm desks, instructor table, screen and projector. Projector is fixed to ceiling and screen is also fixed to front wall (see Figure 4.1). Although instructor’s table is not fixed, it cannot be changed because of the spaced platform.

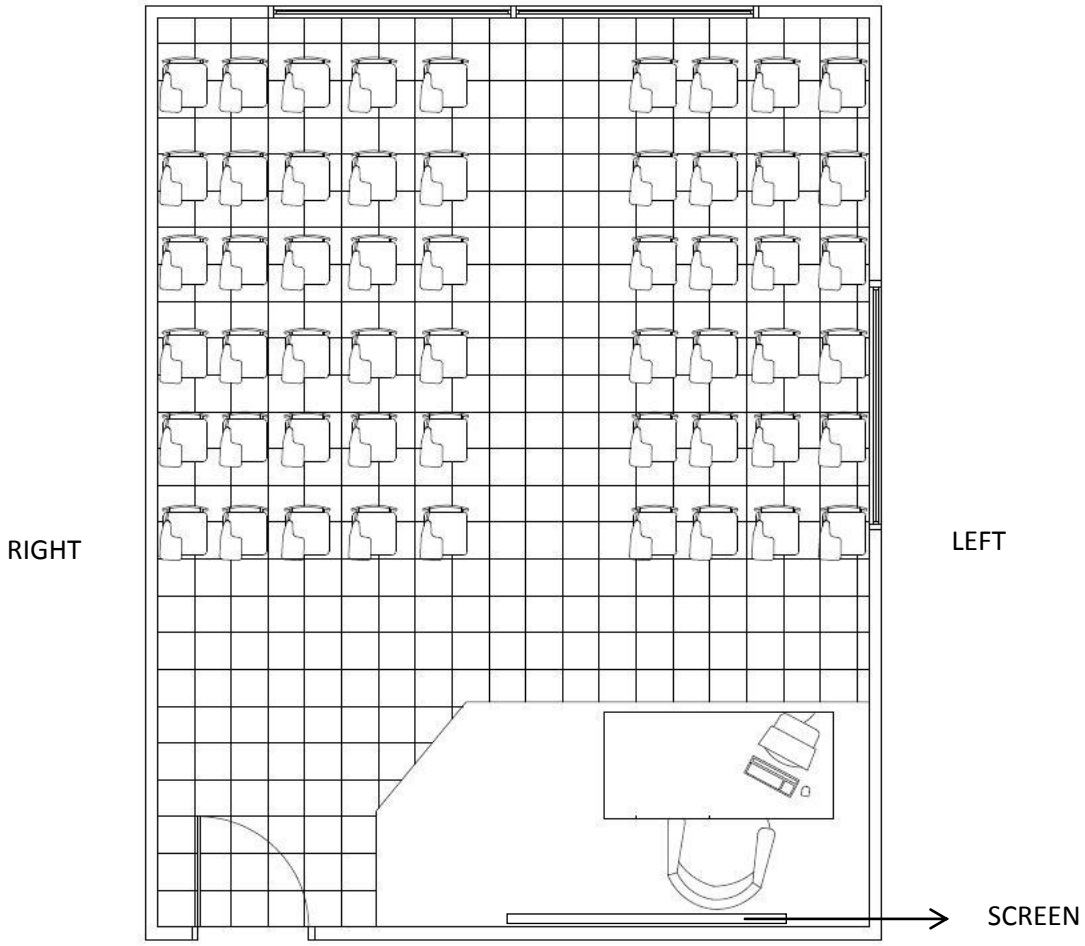

Figure 4.1. Plan of the chosen lecture room

This fixed design and equipment limit the ways of using the class room, although as physical space it has potential for other patterns of teaching. The current arrangement is not very suitable for smaller groups of students and less formal teaching sessions. The typical lecture room is longitudinal space as shown in Figure 4.1. So, when seating units arranged in straight row of circulation, a long corridor is occurring in the row seating arrangement. In the sense of distance, students who sit back side can have difficulties to be attentive, to concentrate on lecture or to be interactive; however, s/he can feel better in terms of personal space and territoriality. This situation can also be difficult for instructor to take attention of students.

In contrast, when the classroom was arranged in U- Shape seating arrangement, because of the elongated proportions of the room, the circulation between desks has become very narrow (see Figure 4.2). Therefore, students had difficulties to sit their place and instructor had also difficulty to move between students while giving lecture.

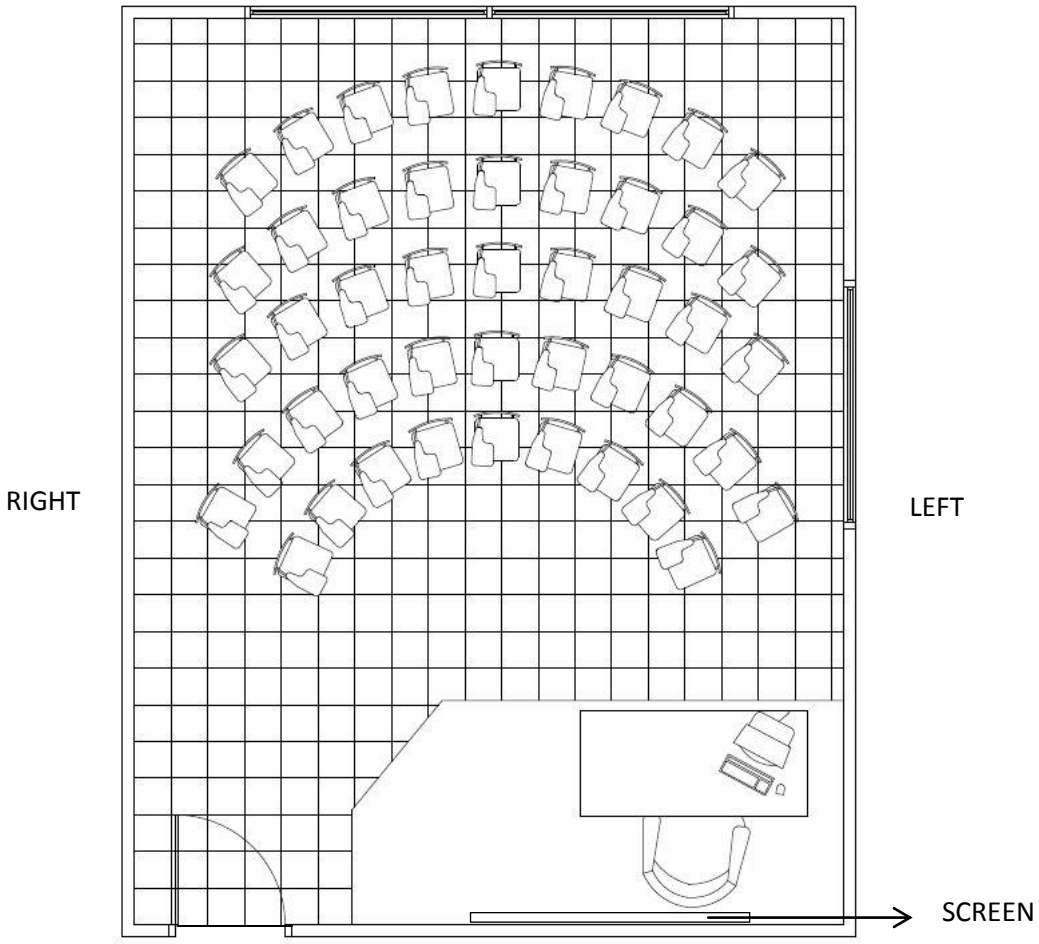

Figure 4.2. Plan of the lecture room in U- Shape seating arrangement

The potential of the space is not exhausted with this given straight row arrangement. So, if the instructors desk and equipment were more flexible – such as to be located on the long solid wall, the u-shape arrangement would have been more easily employed. Also if this classroom had been transverse space or square in form, there

would be more opportunity to re-arrange it (see Figure 4.3 and Figure 4.4) for different teaching patterns. In these two situations, with the windows remaining as is, but by changing the desk, screen and projecting equipment, design of the seating arrangement could be more flexible and it could give more opportunity to provide appropriate circulation areas.

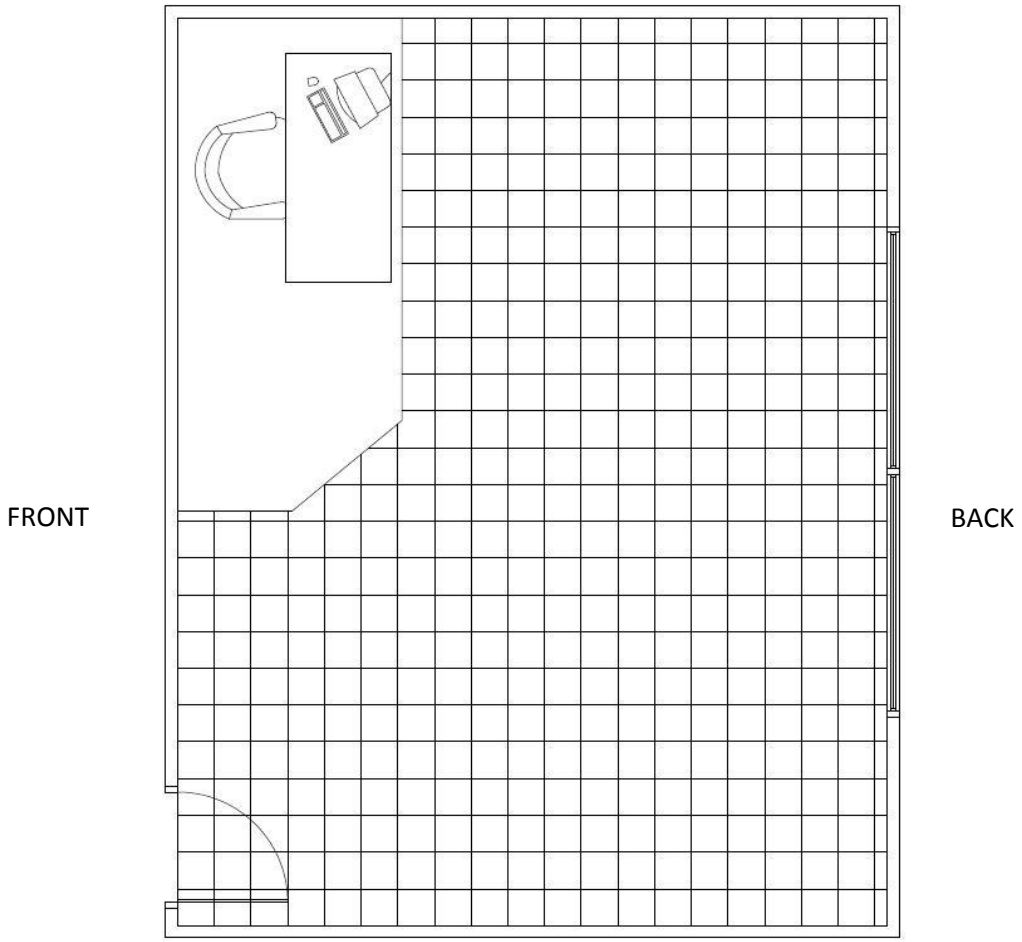

Figure 4.3. Plan of the transverse use of lecture room

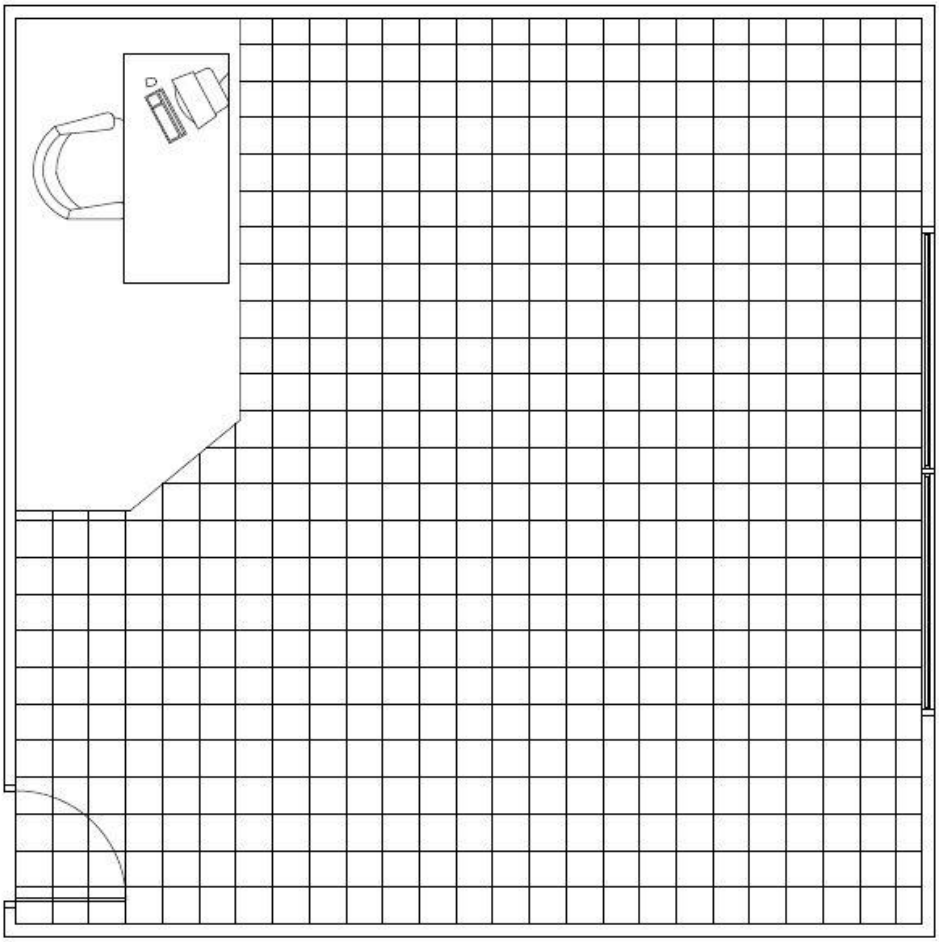

Figure 4.4. Plan of the square use of lecture room

4.2.2. Techniques

The methods of the study are both qualitative and quantitative research and it is also a longitudinal study because it was examined with the same sample group and different seating arrangements. Aside of space analysis as technique, direct observation, indirect observation and questionnaire were used. Firstly observations were made and then questionnaire was administered.

4.2.2.1. Observations

The first technique is observation: It includes observations of different types of teaching activities – lectures and discussion tasks – implemented for both arrangements. Hence the observations were comparing the student-student interaction, students- teacher interaction, participation of the students, attention of the students, as well as behaviors and attitudes to territoriality in terms of physical space, in the context of two arrangements as different types of shared settings.

The study was conducted in the context of a course: 'FA 171 Art and Culture I' class over an eight week period. The first four- week period was for observing the teaching/learning activities in the typical straight row seating arrangement. The second four-week period was for U- Shape seating arrangement, which was experimentally applied within the same space. Students were informed of the study which means they have known that they were observed and become voluntary participants; however; they were not acquainted with the specific details of the research.

The study was administered in the scheduled course hours in different days in a week: Monday from 9.30 am to 10.20 am and Wednesday from 10.30am to 12.00 am. For both arrangements the course procedure was documented in photographs and videos, students' attention, concentration, interaction, and space use were observed and notes were taken to an observation sheet (See Appendix C1). The researcher attended each session to conduct direct observation. In the observation, aspects and

attitudes of students were noted: whether students were interested in lecture or were doing other things like playing with mobile phone or chatting with friends, their participation to the lecture or not were taken into consideration by researcher and notes were taken. In addition, each ten minutes, photos and videos were taken in determined time zones for indirect observation. These would allow afterwards comparing and observing students' seat preferences and how they determine their territory.

In terms of course material, aside of regular lectures of the course program, special discussion tasks were given to students in each type of arrangements (see Appendix C2 and C3). These sessions were observed directly in terms of attention, concentration and interaction and also videos were recorded in discussion sessions. The discussions tasks were not related to the subject of this study, but to the Art and Culture course. The normal lectures were conducted as power-point presentations. The discussion activity was organized as follows: upon a projected image students have divided to groups of two and ten minutes were given to discuss among themselves and to make statements for each image. After ten minutes they were asked to discuss and their participation was recorded and noted. After direct observations conducted, indirect observation was made with photograph analysis and video analysis to analyze behaviors of students more deeply (see Appendix C4).

4.2.2.2. Questionnaire

At the end of the experiment and observations, a questionnaire was distributed to students (see Appendix D).The survey includes demographic questions such as name

and surname which was not obligatory to write, as well as gender, age. There are thirty-one questions in the questionnaire. The year of starting to department and if it is first time in FA 171Art and Culture I or not were asked. In several questions, students' feelings about both traditional row seating arrangement and U-Shape seating arrangement were asked in different forms as well as questions about students' choice of seating arrangement type and personal space and seat preferences questions. This questionnaire intended to identify the students' perception of the aspects in question, so as to be able to compare these perceptions with the results from the direct observation.

According to their answers statistical analyses were conducted with SPSS software. To get idea about questions in survey, a thesis which is *Effects of different seating arrangements in higher education computer lab classrooms on student learning, teaching style, and classroom appraisal* by Jessica Callahan was used as reference (2004). However, questions were not taken to directly into this study. After questions were analyzed, they were improved and adjusted to this investigation. The questionnaire had four types of questions which are likert scale questions, open-ended questions and close- ended questions.

4.2.2.3. Interview

An interview was conducted with the instructor of the FA 171 Art and Culture I class whose name is Assist. Prof. Maya ÖZTÜRK. Her responses were of value since she is an experienced lecturer of more than 20 years at Bilkent University. The interview was about the potential which the instructor saw towards two types seating

arrangement. It was asked that what she thinks about the effects of physical environment on learning experience, whether seating arrangement affects student's attention, concentration and interaction or not. She was asked to express her observations about both the typical straight row arrangement and U-shape arrangement, and whether the effects of two types of seating arrangement are different in terms of communication with students or not, and which seating type she prefer and why. Finally, there was a question whether students give importance to territoriality and personal space or not (see Appendix E).

4.3. Findings & Discussion of Results

The obtained results are analyzed as both qualitative and quantitative. The results of observations and response of interview questions were analyzed and in addition to these some statistical analyses were conducted by using Statistical Package for the Social Sciences (SPSS 21.0). To analyze data descriptive statistics were used.

4.3.1. Findings of Observation Data

As it is mentioned in techniques part, both direct and indirect observations was made for the two different settings. Indirect observation was made to support and confirm direct observation. While conducting direct observation, it is seen that all students were fully concentrated on lecture in both seating arrangements type at the beginning of the lecture; however, concentration of student decreased when the time passed especially the students who sat back side of the room, especially in the straight row

arrangement as they are far back. In addition to these, it was observed that students who sat front side and closer seating to instructor were more attentive than who sit back sides. Furthermore, when students have eye contact with instructor, they were more attentive to course even if they were sitting in the back. Finally, students tried to create their own personal space and territorial by putting their belongings to next chair. However people who are close friends they were more comfortable to sit next to others in both arrangements.

During observation on students, it is seen that the attention of the students to the lecture is higher in the regular straight row seating arrangement. As it is mentioned above, even though the concentration of students was related to the time pass in both arrangements, students lose their concentration later in the straight row seating arrangement. Additionally, it was observed that participation and interaction is lower in straight row arrangement. Only the students who sat front side of the classroom participated more actively to the lecture hour. In addition to these, it is seen that students mostly preferred to sit right side and front side (see Figure 4.1) of the classroom in the straight row seating arrangement and students who sat back side of the arrangement tried to isolate themselves and they tried to be not disturbed from other students.

Also, it is observed that students have more participated and more interactive in U-Shape seating arrangement. Even if students sat back side of the classroom they participated in the lecture and also they discussed with instructor and between each other. It was observed that even students that generally prefer to detach themselves in

the back were quite active when included in the u-shape. In contrast to the straight row arrangement, in the u-shape setting students' attention to the lecture sessions was lower and their concentration lost sooner. In addition, students preferred generally second and third line, and also middle part of the arrangement. However, seating preference and locations was changing according to empty place when they came to classroom. Because of the narrowness between seat units, students were anxious about their personal space in U- Shape arrangement.

In addition to direct observation, photographs (see Appendix F) and videos which were taken during lecture session were analyzed. In discussion tasks, it become clearly evident that students were much more interactive and participated more in U Shape seating arrangement including even students never talk in traditional row arrangement. Students were more focused on lecture who concentrated on task in the straight row seating arrangement.

4.3.2. The Statistical Analysis of Questionnaire

To analyze the results of the questionnaire concerning the students' perception as to their attention, concentration and participation, seating preferences and territoriality in both different settings, percentages were used and descriptive statistics were calculated with SPSS 21.0. The Questionnaire was analyzed in four parts which are personal questions, personal space questions, questions concerning perception of the students in terms of attention, concentration, interaction and participation as well as

questions about seating preferences in terms of both traditional row arrangement and U-shape arrangement.

According to the results of the personal questions, 19 students out of 26 (73,1%) have started education at the department in Spring Semester, 2014. 22 students out of 26 (84,6 %) have experienced different types of seating arrangements before in university or their high school or elsewhere (See Appendix F, Table F.1 and F.2). Only 5 students of the sample group (19,2 %) took FA 171 Art and Culture I class before, and have comparative basis as to content and conduct. With respect to self-evaluation and attitudes, 21 students (80,8 %) are neutral in describing themselves in terms of whether they are quiet or talkative in classroom.

In addition to personal questions, the questions related to personal space were asked and results show that there is a tendency for the students to say strongly disagrees when asked about getting distracted by the people near themselves. Also while 7 students out of 26 (26,9 %) were neutral about sitting near people, 7 people (26,9 %) more agree with respect to sitting near other people (See Table 4.1 and Figure 4.5).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	19,2	19,2	19,2
	2	7	26,9	26,9	46,2
	3	7	26,9	26,9	73,1
	4	4	15,4	15,4	88,5
	5	3	11,5	11,5	100,0
	Total	26	100,0	100,0	

Table 4.1 The percentages of whether students like sitting near other people or not.

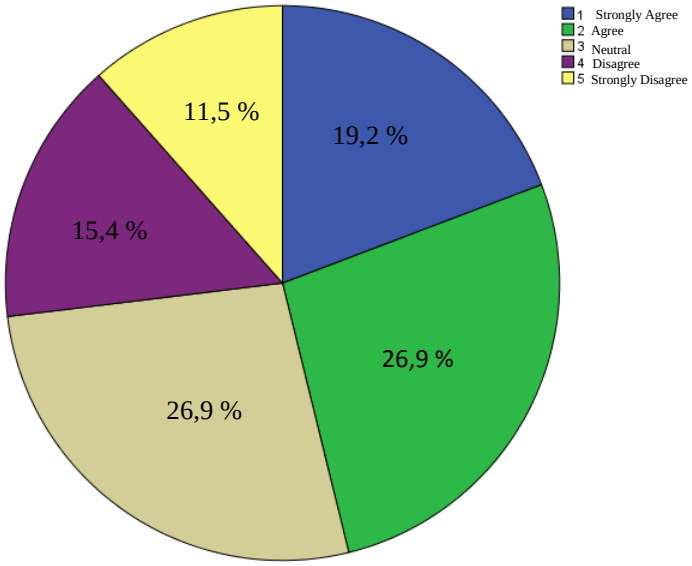

Figure 4.5 The percentages of whether students like sitting near other people or not.

In terms of the straight row seating arrangement, the mean of responses about 'attention' is 2, 15 out of 5 –i.e. 12 students (46,2 %) think that attention is good in traditional row arrangement and 23 students (88,5 %) said that they more attentive in

row arrangement (see Table 4.2 and Figure 4.6, and Appendix F, Table F.3, Table F.4 and Figure F.1)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	23,1	23,1	23,1
	2	12	46,2	46,2	69,2
	3	6	23,1	23,1	92,3
	4	2	7,7	7,7	100,0
	Total	26	100,0	100,0	

Table 4.2 The percentages of attention in traditional row arrangement

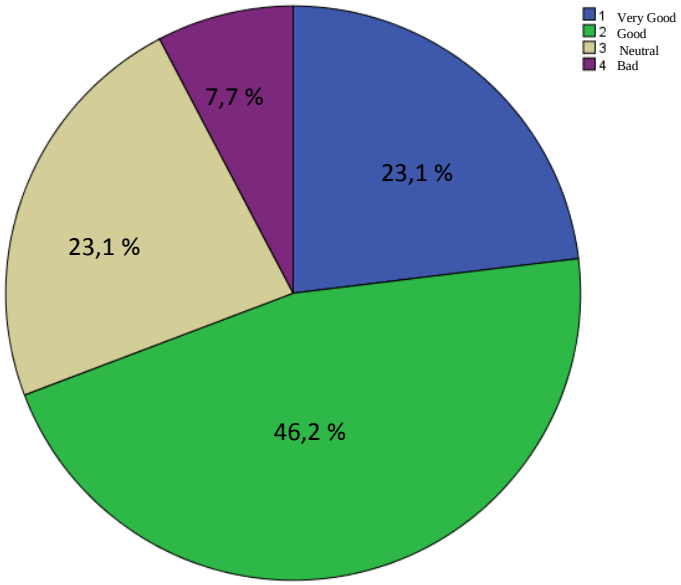

Figure 4.6 The percentages of attention in traditional row arrangement

In relation to attention, the mean of responses to question about 'concentration' in traditional row seating arrangement is 2.46 and 9 students (34,6 %) responded that concentration is good in regular seating arrangement (See Table 4.3 and Figure 4.7, and Appendix F, Table F.5).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	19,2	19,2	19,2
	2	9	34,6	34,6	53,8
	3	8	30,8	30,8	84,6
	4	3	11,5	11,5	96,2
	5	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table 4.3 The percentages of concentration in traditional row arrangement

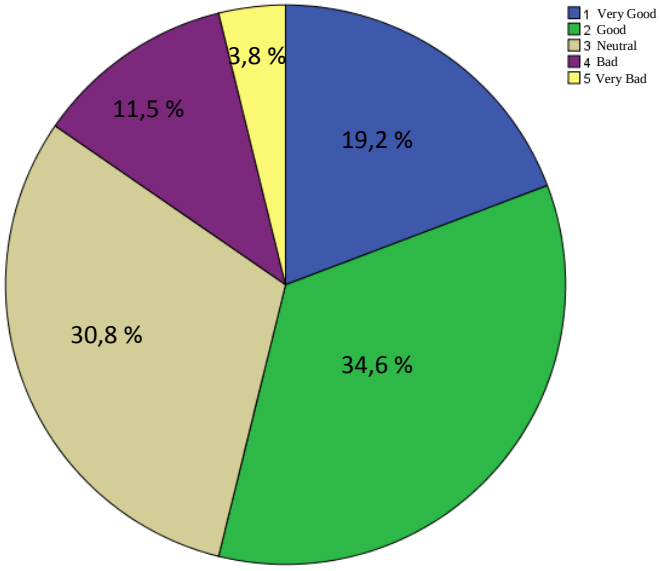

Figure 4.7 The percentages of concentration in traditional row arrangement

The questions concerning how students feel about interaction in the straight row arrangement, 8 students (30,8 %) responded that interaction is good. However, the other 8 students (30,8 %) were neural about interaction. The mean of interaction is also 2.77 (See Table 4.4 and Figure 4.8, and Appendix F, Table F.6)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	3	11,5	11,5	11,5
	2	8	30,8	30,8	42,3
	3	8	30,8	30,8	73,1
	4	6	23,1	23,1	96,2
	5	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table 4.4 The percentages of interaction in traditional row arrangement

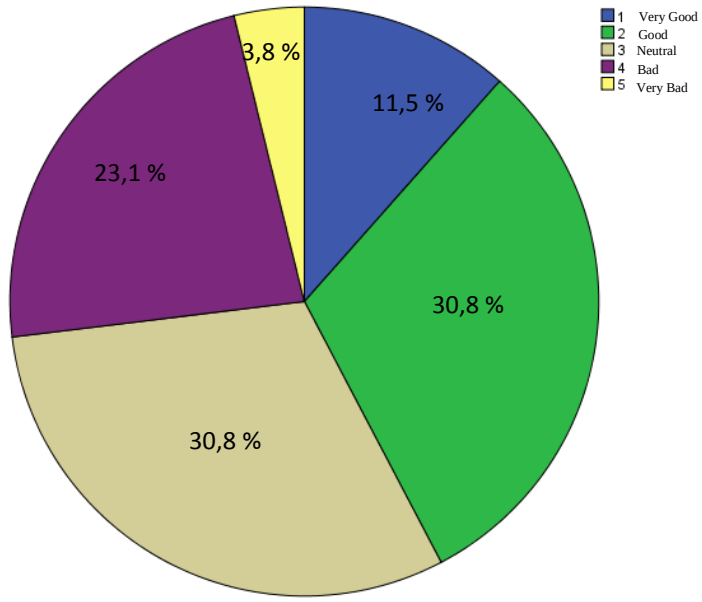

Figure 4.8 The percentages of interaction in traditional row arrangement

After the straight row arrangement questions, students were asked to state their opinion about the U-Shape they experienced change. While 10 students (38,5 %) were neutral and the mean is 2.54 at first time, later on 10 out of 26 students (38,5 %) said that the new arrangement is good in next time and the mean is 2.35 (see Table 4.5 and 4.6 and Figure 4.9 and 4.10, and Appendix F, Table F.7 and Table F.8).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	23,1	23,1	23,1
	2	5	19,2	19,2	42,3
	3	10	38,5	38,5	80,8
	4	5	19,2	19,2	100,0
	Total	26	100,0	100,0	

Table 4.5 The percentages of opinion about changed arrangement at first time

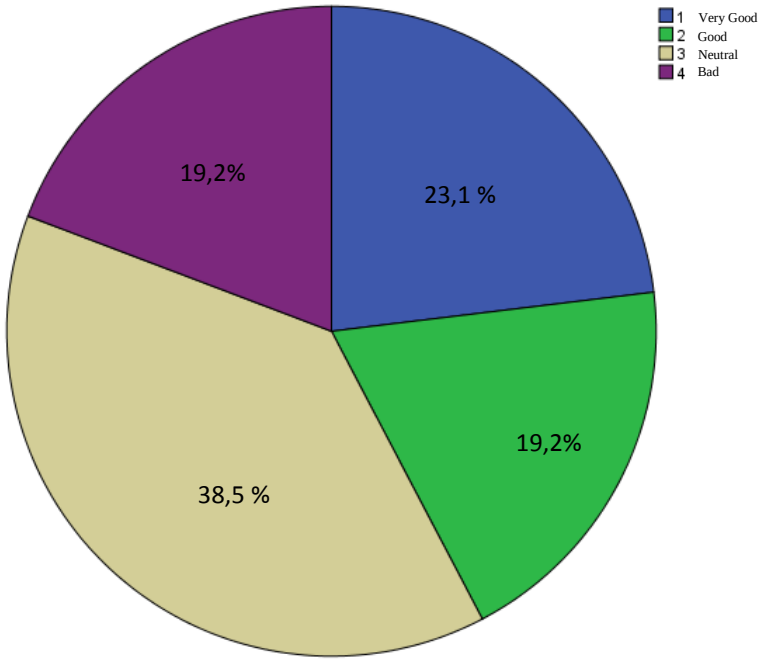

Figure 4.9 The percentages of opinion about changed arrangement at first time

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	19,2	19,2	19,2
	2	10	38,5	38,5	57,7
	3	8	30,8	30,8	88,5
	4	3	11,5	11,5	100,0
	Total	26	100,0	100,0	

Table 4.6 The percentages of opinion about changed arrangement in next times

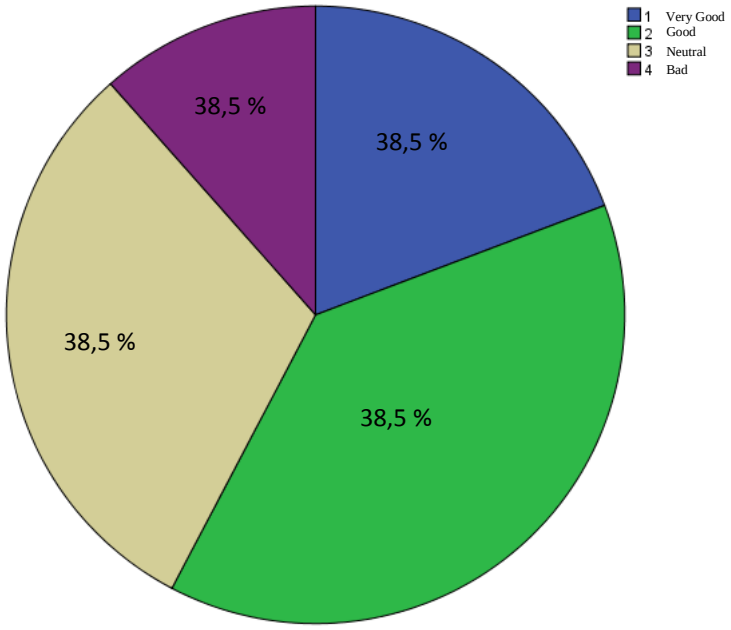

Figure 4.10 The percentages of opinion about changed arrangement in next time

With respect to 'attention' in U-Shape arrangement, 8 students (30,8 %) feel that attention is good and the mean is 2, 38 (see Table 4.7 and Figure 4.11, and Appendix F, Table F.9).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	8	30,8	30,8	30,8
	2	6	23,1	23,1	53,8
	3	7	26,9	26,9	80,8
	4	4	15,4	15,4	96,2
	5	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table 4.7 The percentages of attention in U- Shape arrangement

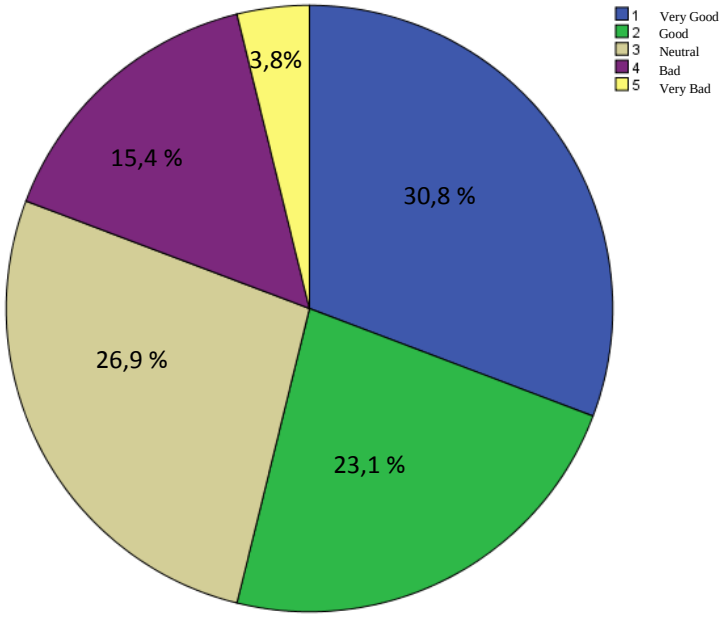

Figure 4.11 The percentages of attention in U- Shape arrangement

Additionally, while 7 students out of 26 (26, 9%) think that concentration is very good in U-shape, the other 7 students out of 26 (26, 9%) think that is good. Also other 7 students (26, 9%) were neutral. The mean is 2, 42 (see Table 4.8 and Figure 4.12, and Appendix F, Table F.10).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	7	26,9	26,9	26,9
	2	7	26,9	26,9	53,8
	3	7	26,9	26,9	80,8
	4	4	15,4	15,4	96,2
	5	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table 4.8 The percentages of concentration in U-Shape arrangement

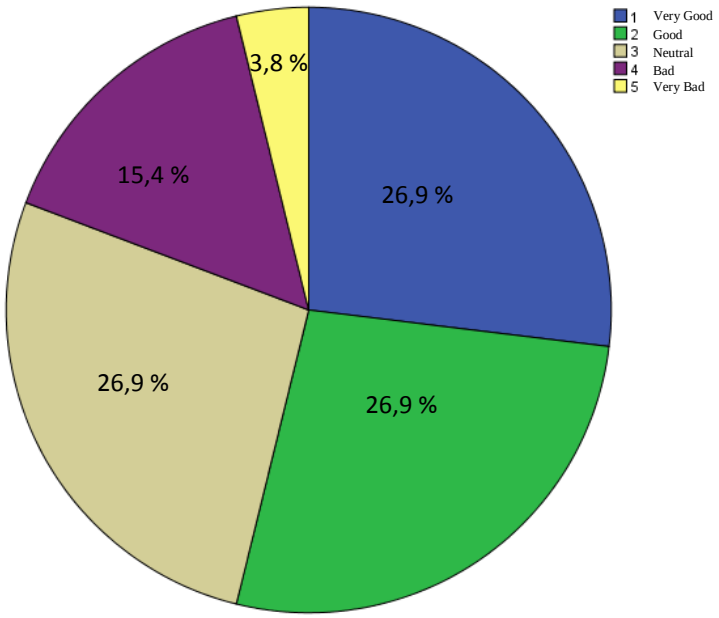

Figure 4.12 The percentages of concentration in U-Shape arrangement

With respect to 'interaction', 12 students (46,2 %) responded that U-Shape arrangement is good and the mean of responses to interaction is 2, 27. Also, the question which is related to impression about the effects of U- Shape arrangement, 10 students (38,5 %) think that it is good and the mean is 2,46 (see Table 4.9 and 4.10 and Figure 4.13 and 4.14, and Appendix F, Table F.11 and F.12). In addition to these, 16 students out of 26 (61,5%) think that they are more activated and participate more frequently in U- Shape seating arrangement (see Appendix F, Table F.13 and Figure F.2).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	6	23,1	23,1	23,1
	2	12	46,2	46,2	69,2
	3	4	15,4	15,4	84,6
	4	3	11,5	11,5	96,2
	5	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table 4.9 The percentages of interaction in U-Shape arrangement

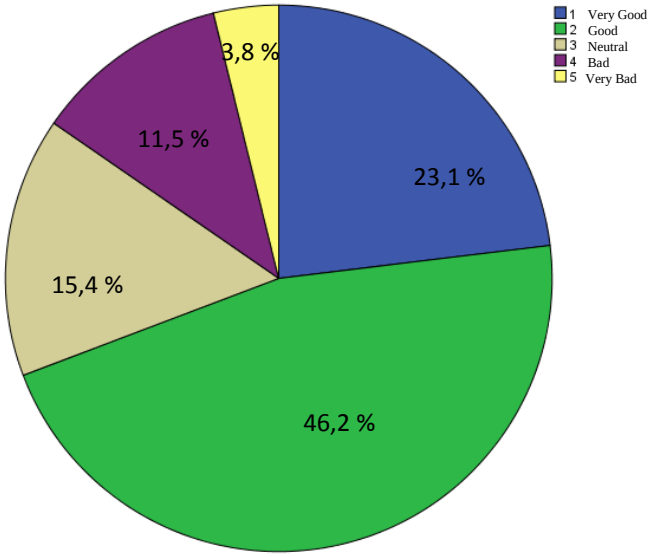

Figure 4.13 The percentages of interaction in U-Shape arrangement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	19,2	19,2	19,2
	2	8	30,8	30,8	50,0
	3	10	38,5	38,5	88,5
	4	2	7,7	7,7	96,2
	5	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table 4.10 Impression about the effects of U- Shape arrangement

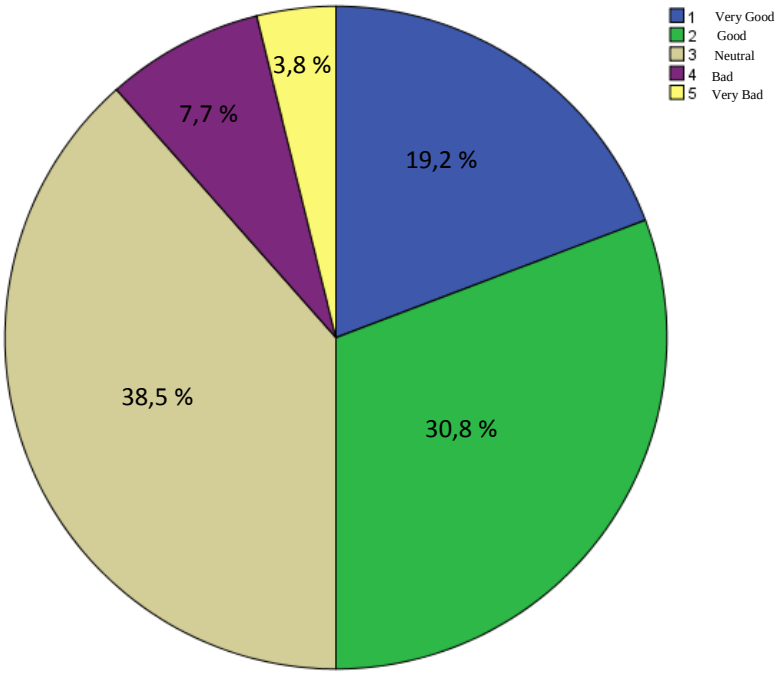

Figure 4.14 Impression about the effects of U- Shape arrangement

In addition to cross check responses, these students were asked about perceived differences between the straight row arrangement and U- Shape arrangement in terms of discussion and participation. So, 21 students (80,8 %) responded that discussion and participation are different in two types of arrangement (Appendix F, Table F. 14 and Figure F. 3). In regard of communication; it was asked whether students feel differently in the two different arrangements with respect to instructor and to other students. According to these, 19 students (73, 1 %) think that communication with instructor is different in two arrangements and 17 students (65, 4 %) think that communication with others also different in two arrangements (see Appendix F, Table F.15 and Table F.16, and Figure F.4 and Figure F.5).

Furthermore, seating preferences are also analyzed with this questionnaire. The question provided plan schemes of both seating arrangements and asked where they

would prefer to sit in each schemes. Additionally, each line was enumerated by the researcher. In accordance, 13 students (50 %) preferred to sit third line of the traditional row seating arrangement and it is followed by the second line with 7 students (26,9 %). The mean of responses to seat preferences is also is 3.00 (see Table 4.11 and Figure 4.15, Appendix F, Table F. 17). In addition to choice of line, 14 students (53,8 %) students preferred to sit right side of the classroom (see Appendix F, Table F. 18 and Figure F.6).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	3,8	3,8	3,8
	2	7	26,9	26,9	30,8
	3	13	50,0	50,0	80,8
	4	3	11,5	11,5	92,3
	5	1	3,8	3,8	96,2
	7	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table 4.11 Seat preferences in traditional row seating arrangement

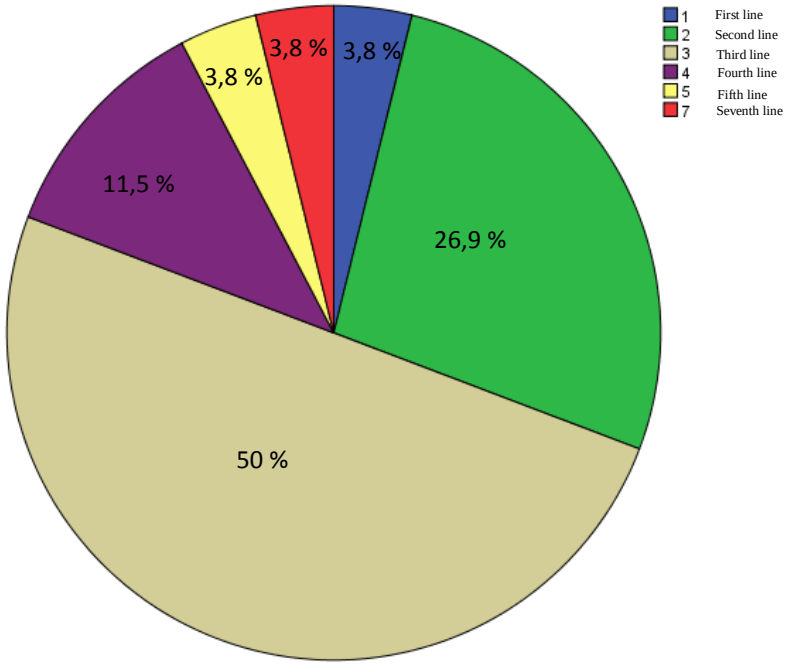

Figure 4.15 Seat preferences in traditional row seating arrangement

In the U-Shape arrangement, 14 students (53, 8%) preferred to sit third line too, and 10 students (38, 5 %) chose to sit second line and the mean of choices is 2.58 (see Table 4.12 and Figure 4.16 and, Appendix F, Table F.19). In addition to these, 18 students (69, 2 %) students preferred to sit middle part of the U-shape arrangement (see Appendix F, Table F. 20 and Figure F.7). In addition, the choice of overall seating arrangement was equal (see Appendix F, Table F.21 and Figure F.8).

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	3,8	3,8	3,8
	2	10	38,5	38,5	42,3
	3	14	53,8	53,8	96,2
	4	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table 4.12 Seat preferences in U- Shape seating arrangement

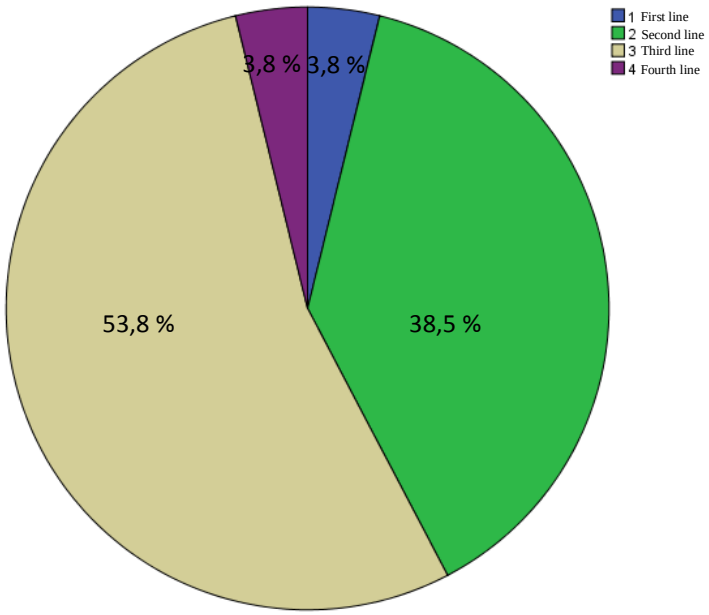

Figure 4.16 Seat preferences in U- Shape seating arrangement

4.3.3. Correlation of Research Techniques' Results and Discussion

In this thesis, effects of different seating arrangements on learning experience in medium sized lecture settings were researched. In the study, it was hypnotized that two types of arrangement, which are the straight row lecture room and U shape lecture room, have different effects on learning experience in terms of attention, concentration, interaction, and satisfaction as aspect of learning, as well as a territoriality and personal space as attitude to collective settings. The different effects of arrangements were analyzed by experimentally implementing both in one typical lecture room.

In this current study, the sample group was composed of 26 students from 'FA 171 Art and Culture I' in the Department of Interior Architecture and Environmental

Design in Bilkent University. The case study was conducted in one typical medium size lecture room. Confirming that classroom environment has great influence on students' learning experience. In regard of the lecturer Assist Prof. Dr. Maya Öztürk states the importance of physical environment in her interview (see Appendix E, Question 1). So, the results should be analyzed to compare this current study with other studies which were researched before. According to results, there are both similarities and differences with the statements which were mentioned in literature.

In the literature review, it is said that on- task behavior of students, which means concentration and attention, is increasing in the straight row seating arrangement (Wheldall et al., 1981 as cited in Wannarka and Ruhl, 2008). Also, the main opinion is that students are passive learners in the straight row seating arrangement and in that setting they do not prefer to talk without permission (Haghighi & Jusan, 2011; Axelrod et al., 1979). In this respect, the case study supported this statement with descriptive statistical analysis and also with observation results. However, the results show that students also think that straight row arrangement is also good in terms of interaction.

The results of U-Shape arrangements questions were similar with literature; however, some unexpected results were also obtained. Other researches on this type of arrangement state that students are more participating, interactive and they are more open to discuss in U- Shape arrangement, and it is also stated that learners ask more questions in this arrangement (Wannarka a& Ruhl, 2008; Haghighi & Jusan, 2011; Ammaranas, 2010; Steinzor, 1950). However, it is also said that while the instructor

is lecturing, the attention of the students can be more easily distracted in U-shape arrangement (Seivert, n.d.). In this respect, the results of the case study showed that students think that they incline to be more open to participation in lecture, and more interactive with both instructor and other students. However, although it is said that attention would be less than in straight row arrangement, the results show that students tend to be not disturbed in terms attention in U-Shape arrangement. The results obtained from observation also showed that students are more communicative in U-Shape arrangement even if they are not talkative people in general.

In addition to these, concern with personal space, territoriality and seating preferences were found to affect learning experience and satisfaction as aspects of learning. In literature on the subject, when personal space of people intruded, comfort of people is reduced ("Personal space", n.d.). Furthermore, it is mentioned that when students sit front side and center of the classroom they tend to participate more in the lecture (Sommer, 1969). In contrast to these findings in literature, the results of the questionnaire show that students tend to be not distracted when sitting close to other people. However, the results obtained from observations show students try to create their own personal space and territoriality by putting such as books and bags. If they are sitting near their close friends they incline to be more tolerant in terms of personal space and feel less strict about their personal space. The results of the seating preferences in the case study supported the findings in literature. So, results showed that in traditional row arrangement, students are inclined to sit closer to front- right side of the classroom, near the wall (see Figure 4.1). For the U- Shape arrangement, students tend to prefer to sit middle part and front sides.

As the space analysis shows, the spatial potential of the room is more than currently utilized. This is due to the fixed nature of equipment, which allows only row arrangement comfortably. However, if they were movable, the classroom could be designed more flexible face. If only the projector was movable or fixed to ceiling but could be turned other sides, there would be more opportunity to arrange the classroom in different types of seating appropriately. Thus, the instructor can change the arrangement according to his/ her teaching technique or purposes. For example, if the instructor wants to have discussion session, she/he can turn the projector towards the long blank wall and arrange classroom in U-Shape, but if the instructor wants to more attention to lecture in classroom, then she/ he can turn to projector front side of the room and arrange in traditional row. Thus, learning space could serve for both types of arrangement and different teaching techniques more appropriately.

In addition to the questionnaires made with the students, also an interview was conducted with the lecturer. Referring to the answers taken at the interview from her, she thought that physical environment is an important and effective variable in the learning experience of the students. It may affect students either in positive way or negative way with its general quality. She then continued that lecture rooms should be designed in a way that they are suitable for various seating types because different courses, and different tasks and patterns of teaching/learning, which may require different types of seating. When her ideas on straight row seating was asked, she mentioned that it is the most formal seating type which she preferred in her lecture class sessions because she thought that that type of seating increases the level of concentration and attention, but not the level of interaction of the students even with the instructor. Although she preferred straight row seating in her Art and Culture

courses which is mainly based on visual presentations, she also added that it hindered other types of learning and teaching experiences and limited the course to lecturing. Contrarily, she found U-shaped seating arrangement better for discussion sessions of the lecture and courses which needs collaborative activities in their syllabus. However, she added that the given class room is not flexible enough for re-arranging it. When group work was mentioned at the interview, she said that the best seating arrangement for groups would be clusters with 3-4-5 people in one. Moreover, she also thought that U-shape seating is the best inclusive and unifying arrangement for students, as a group. When the topic came to the personal space and the territoriality conception of the students, she said that she observed frequently how students define their personal spaces with their personal belonging put next to them. Also, students try to sit with their best friends near places to protect their territoriality and save their comfort zones. As the final question, she was asked that which seating type she prefers for her lectures and she chose the U-shape seating type, but she also added that seating types should be adjustable to correspond best to different teaching patterns, and for different sizes of student groups, rather than a universal fixed configuration for all type of courses.

CHAPTER V

CONCLUSION

5.1.Contributions of the Study

This thesis presents a concrete study of effects of the physical environment on the learning experience in the context of higher education. Its contribution lies in that it studies some of the influences of different seating arrangements with respect to the learning experience. Based on direct observation and indirect perception of students' responses, it specifies how the arrangement of the learning environment may reflect on certain aspects of the learning experience, such as concentration, attention, and interaction, as well as aspects of space use as social factors. It focused on typical medium sized lecture rooms comparing two types of seating arrangements – the straight row arrangement and U- Shaped seating arrangement in terms of concentration, attention, and interaction as well as with respect to their influence on the social factors such as personal space, territoriality and seat preferences.

This topic is important with respect to the rapid changes in the education systems, and the growing recognition that learning experience and the physical settings of learning environment take crucial role in people's life. According to past researches, the features of the learning environment are considered in general term, such as size and area-student number ratio, quality of lighting and acoustics, visibility, aesthetics and maintenance. Furthermore, there is emphasis on the teaching-learning process stating that instructors should be aware of which teaching styles may help the improvement of students learning capability; so, she/ he should decide teaching techniques which means whether they want only lecturing, group working or discussion. It is also acknowledged that decisions about the arrangement of the learning space is important because it is said that different types of seating arrangements serve for different teaching techniques. The straight row seating arrangements are effective for lecturing and they are better environment for enhancing attention and concentration on lecture. It supports students focus on instructor and instructor can guide students more easily, while students are more passive. U- Shape arrangement is identified as better environment for discussions and it allows for collaboration. Also, the interaction and participation is higher when classrooms are arranged in U- Shape.

So, this current study also reviews types of seating arrangements and their effects on learning experience, providing more specific results with respect to attention, concentration and participation, as well as on social factors which are personal space, territoriality and seating preferences. These may contribute to already establish standards of learning environments' design concerning general issues such as room

size and proportion, light, acoustics, surface treatments and furniture of the classroom.

The reason for choice of this special research topic is deficiencies of researches about effects of different seating arrangements on learning experience in higher education because studies about learning environments generally focused on primary and secondary schools, and also students who are 12 years old. So, the case study was conducted so as to offer insight into learning environments for higher education. The choice was on the typical medium size lecture room, and the example examined in the FF 102 lecture room in the Department of Interior Architecture of Environmental Design at Bilkent University in Ankara. The reasons for choosing the typical lecture room was to see the potential and possibilities of the room as physical environment, aside of more general features of the space such as location, size, proportion of the classroom as well as location of the entrance. It was found that the fixed equipment which are screen, projector and platform for instruction's desk, and the contingent number of seating units which are 54 arm desks, does not allow to use the space efficiently for other types of arrangement – it is not flexible . The equipment and furnishing as physical factors of the chosen classroom serve appropriately only to straight row arrangement. In addition to these fixed conditions, and because of the space being longitudinal and its entrance on the narrow side, it was problematic to have a different u-shape arrangement in spite of its potential and other qualities.

In the case study, the hypothesis was that straight row lecture room arrangement is more efficient with respect to concentration, attention and self- perception as

individual, while the U- Shape lecture room is more efficient with respect to participation, interaction and group working. Both in the observations and in the students' responses these hypothesizes were supported. It was found that students would tend to act and evaluate their experience accordingly. In regard of space use, it was found that students show two districts for seating preferences in terms of learning and personal space in both arrangements; If the students want to concentrate on lecture, they choose to sit directly opposite side of the teacher and if the students feel stricter about territoriality, they choose to sit edge part of the arrangement. As research techniques, direct and indirect observation was conducted to figure out students' attention, concentration, participation and interaction as well as attitudes of students in terms of personal space, territoriality and seating preferences. The questionnaire aimed to analyze the perception of the students of their learning experience towards attention, concentration, participation and interaction and effects of personal space, territoriality and seating preferences and types of seating arrangements. In addition the interview with lecturer aimed to obtain ideas effects of different seating arrangements in collective settings from the perspective of the instructor. The sample group was composed of 26 students from 'FA 171 Art and Culture I' course. At the end of the study, it is seen that the results of the current study support the researches which were done previously. So, it is found that students tend to be more attentive and more concentrated on lecture in Traditional Row Arrangement and they are more participated in U- Shape lecture room. Also if students want to concentrate more, they seem to choose seats where they are closer to instructor. Finally, it was seen that students tend to be more tolerant in terms personal space when they sit next to their close friends.

With respect to results of current study, there are several contributions. Firstly, the current study contributes to the ongoing studies about the design of education facilities. In addition to this, this study can help to architects, designer or administration of educational institutions to create better and effective learning environment and the results also contribute choice of seating arrangement according to varying teaching techniques. Moreover, this current study also analyses effects of personal space, territoriality with respect to seating preferences on students' spatial behavior in collective settings. So, as there are no too many correlated researches about these features of the physical learning environment in correlation with the aspects of learning experience, , this study results also contribute by concretizing and highlighting such correlations.

5.2. Limitations of the Study

There are some limitations of this investigation. The shape of the given room space (longitudinal space) itself has posited one limitation for this study because the space was not suitable for another type of seating arrangement in its full capacity of 50 workstations. It was only possible to change to u-shape for a smaller number of students, and organize the space for up to 30 chairs. Still, when U- Shape configuration was arranged, there were difficulties to order and the arm chairs, and store the excessive number of seats. Moreover, another obstruction was the fixed equipment such as the instructor's podium with table, the fixed board and screen and projector, which did not allow the U-Shape arrangement comfortably, or organize it towards the long side of the room. There were too many seat units, and the space was too narrow for more than two rows. So the U –Shape had to be flat bow rather

than deep U-Shape according to location of instructor and the screen. Because the location of instructor, screen, and projector were fixed, they are also limitations for this current study.

In addition to these, conducting the study with the same sample group with only one section is another limitation for this study because longitudinal study does not allow the comparison of the different sample groups, or different course practices. If two or more than two sample group was compared in the study, there would be different results because of the different characteristics of each person and success of the different sections.

Another limitation of the study was the time. The experiment was conducted for only eight- weeks; four weeks for the regular straight row seating arrangement, four weeks for U- Shape seating arrangement. Hence while the students were used to the straight row seating arrangement, the four week period for getting used to and experiencing the U- Shape seating arrangement was not enough in comparison because it should take time for adjusting to this changed arrangement, before being able to assess and comment on its perceived effects.

Another limitation was gender. Because of majority of the students in Department of Interior Architecture and Environmental Design are female, genders differences with respect to research question cannot be analyzed in this study.

5.3.Suggestions for Further Researches

In order to identify effects of seating arrangement in more detail, future studies may focus their investigation in more appropriate lecture room spaces that allow arranging the classroom flexibly, and accommodate different types of seating and also different teaching-learning activities and patterns. This would involve experimenting with the location of the instructor and screen. For this other shapes of the room can be chosen, such as transverse space or square. Additionally, these seating arrangements can be studied for different size of student groups. The research type can be changed from longitudinal study to cross- section study to compare sample group too. In addition to these, period of study can be longer than eight weeks to give more opportunity to get used to the both seating arrangements. Furthermore, the study can be also conducted in other departments and gender differences can be taken into consideration. Other research techniques should enrich the findings, such as in-depth interviews can be done with each person and the questions of the survey can be developed especially in terms of personal space, territoriality and seating preferences.

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APPENDIX A

Appendix A. General Normative Basis for Middle Sized Lecture Room

Suggested Setback, Ceiling Heights and Projection Screen Sizes

Table A.1.

Room Depth	**Ceiling Height**	**Projection Screen (width x height) in milimiters**	**Screen Mounting Height**	**Front Row Set Back**
7.62	2.7	1829 x 1372	2.6	2.4
7.6- 9.1	3	1829 x 1372	2.8	2.4- 3.0
9.1- 10.7	3.0- 3.4	2438 x 1829	3.0	3.0- 3.4
10.7- 12.2	3.4	2743 x 2438	3.3	3.4- 3.7
12.2- 13.7	3.7	3048 x 2286	3.5	3.7- 4.0
13.7- 15.2	4	3353 x 2286	3.8	4.0- 4.6
15.2- 16.8	4.0- 4.3	3658 x 2743	4.0	4.6- 5.2
16.8- 18.3	4.3- 4.6	4267 x 3200	4.5	5.5

From: Discussion paper on classroom design guidelines.

Table A.2.

Depth		**No Students**	**Space at front of room**
8.23		30	2.74
8.23	9.75	30- 50	3.05
9.75	11.28	50- 100	3.35
11.28	12.80	100- 150	3.96
12.80	14.63	150- 210	4.57
14.63	16.46	210- 300	4.88
16.46	18.29	300- 400	5.49

From: Discussion paper on classroom design guidelines.

SF Per Student	Capacity	Room Type	Furnishings Anticipated
68.6 cm	20	Seminar Rooms	Movable tables & chairs
55.9 cm	32	Classrooms	Movable tables & chairs
50.8 cm	40 or 48		Movable tables & chairs
53.3 cm	60- 99		Fixed writing surfaces & movable chairs
50.8 cm	100- 119		Fixed writing surfaces & movable chairs
48.3 cm	120- 199		Fixed writing surfaces & movable chairs
45.7 cm	200- 299	Auditoriums	Fixed writing surfaces & movable chairs
40.6 cm	300- 399		Fixed writing surfaces & movable chairs
35.6 cm	400- 650		Auditorium seats with tablet arms
101.6 cm	25- 40	Computer	Computer stations/ conventional monitors
88.9 cm		Instruction Labs	Computer stations/ thin- profile monitors
88.9 cm- 152.4 cm	varies	Other Instruction Labs	Furnishings and space needs depend on function and discipline

***SF: Sizes of Furnishing**

Table A.3 Space standards and furnishings for the lecture rooms.

From Design Guidance: Learning Environments

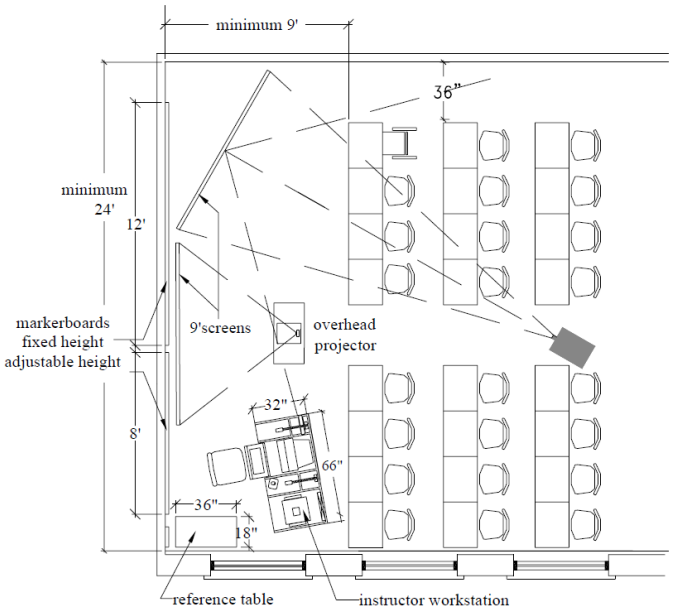


Figure A.1 The optimum criteria for instructor area.

From: Design Guidance: Learning Environments

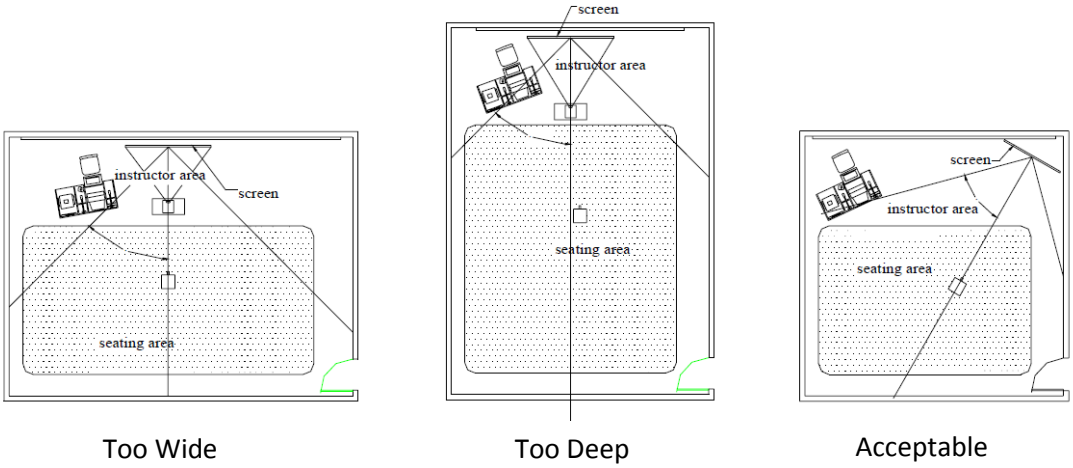


Figure A.2 Impact of room proportion.

From: Design Guidance: Learning Environments

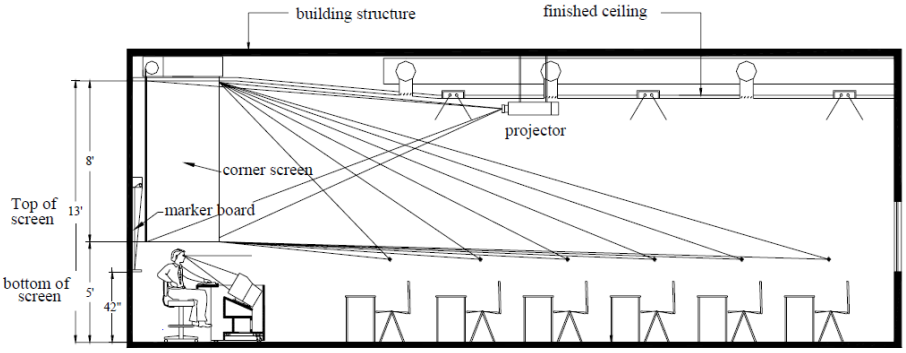


Figure A.3 Optimum ceiling dimensions

From: Design Guidance: Learning Environments

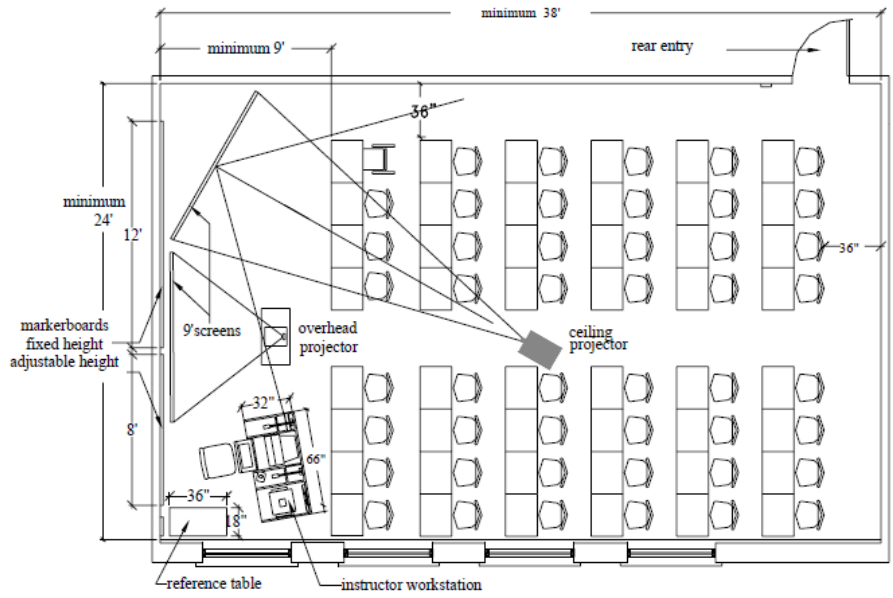


Figure A.4 Typical floor plan of learning space

From: Design Guidance: Learning Environments

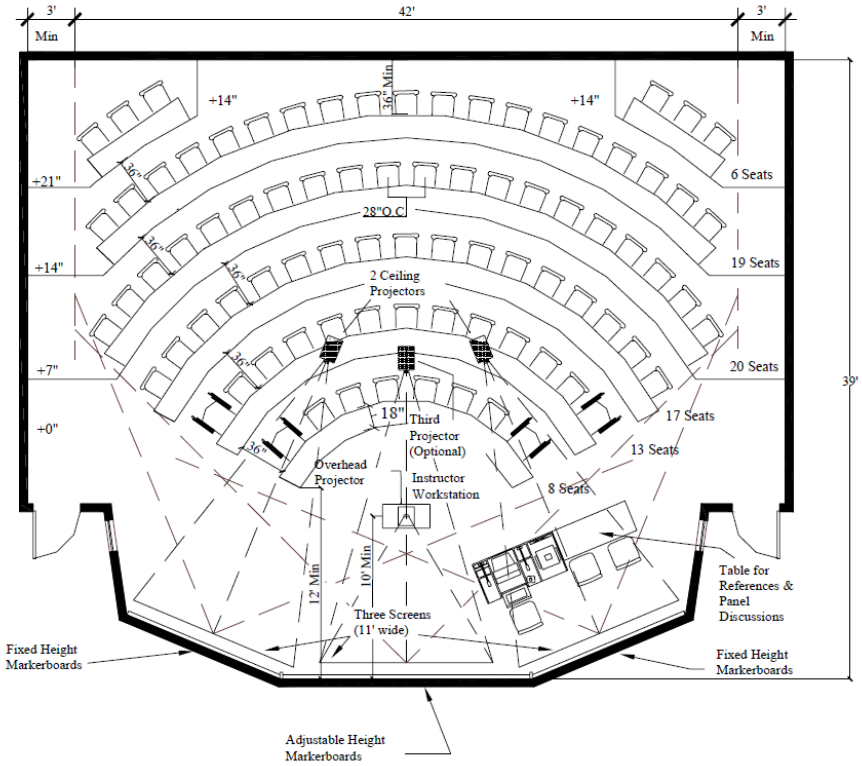


Figure A.5 Interactive learning space.

From: Design Guidance: Learning Environments

APPENDIX B

Appendix B. The Demographıcs of the Participants

Gender_of_Participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	20	76,9	76,9	76,9
	2	6	23,1	23,1	100,0
	Total	26	100,0	100,0	

Table B.1. Distribution of participants according to their gender

Age_of_Participants

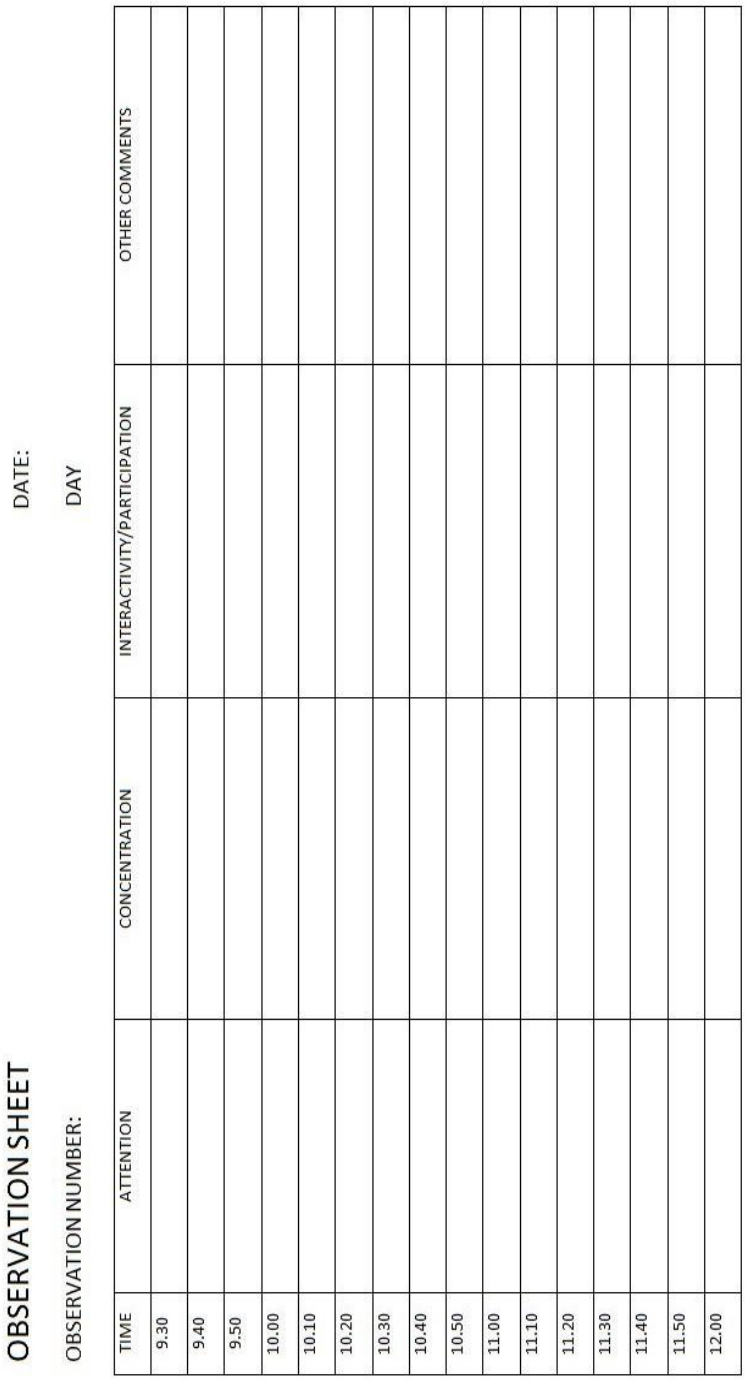
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18	2	7,7	7,7	7,7
	19	9	34,6	34,6	42,3
	20	8	30,8	30,8	73,1
	21	3	11,5	11,5	84,6
	22	2	7,7	7,7	92,3
	23	1	3,8	3,8	96,2
	25	1	3,8	3,8	100,0
	Total	26	100,0	100,0	

Table B.2. Distribution of participants according to their ages.

APPENDIX C

Appendix C The Case Study: Observations on Students

Appendix C1. Observation Sheet



OBSERVATION SHEET

DATE:

OBSERVATION NUMBER:

DAY

TIME	ATTENTION	CONCENTRATION	INTERACTIVITY/PARTICIPATION	OTHER COMMENTS
9.30				
9.40				
9.50				
10.00				
10.10				
10.20				
10.30				
10.40				
10.50				
11.00				
11.10				
11.20				
11.30				
11.40				
11.50				
12.00				

ADDITIONAL COMMENTS:

Appendix C2. The Case Study: Discussion and Activity Session prepared by lecturer Assist. Prof. Dr. Maya Öztürk

Discussion task for traditional row seating arrangement.

Spring 2014 ----- FA 171

Discussion / Activity session

Get into groups of two, put down on a piece of paper both of your names.

Study the shown images and discuss among yourselves and give (bullet form) **three reasons why** each of the images can or cannot be considered ART in the modern sense.

+ **What is their place in everyday life**?

1.

Velázquez's Portrait ofope Innocent X

After Velazquez – Francis, Bacon, 1953;

Screaming Pope

2.

Meret Oppenheim, *Object:*

Fur Breakfast (1936

ARTS AND CRAFTS Movement

William Morris

Appendix C3. The Case Study: Discussion and Activity Session prepared by lecturer Assist. Prof. Dr. Maya Öztürk

Discussion task for U-Shape seating arrangement.

Spring 2014 ----- FA 171

Discussion / Activity session

Get into groups of two, put down on a sheet of paper both of your names.

Study the shown images and discuss among yourselves whether it is or is not a 'nude' (as distinct from 'naked')

1. Give (bullet form) for all of the works shown - three reasons for your opinion.

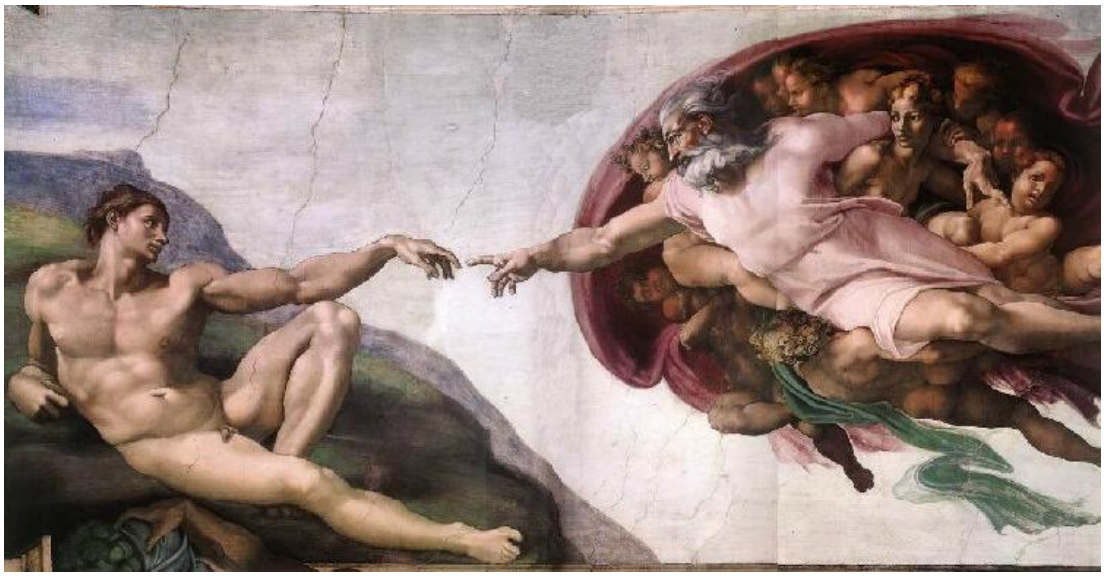
Reclining Bacchante; Trutat, 1824-48

Venus from Willendorf

(25.000 - 20.000 BC)

Aphrodite of Knidos 4th centruy BC.

Didoumeno s, 430



Michalengelo, *The Creation of Adam*, 1508

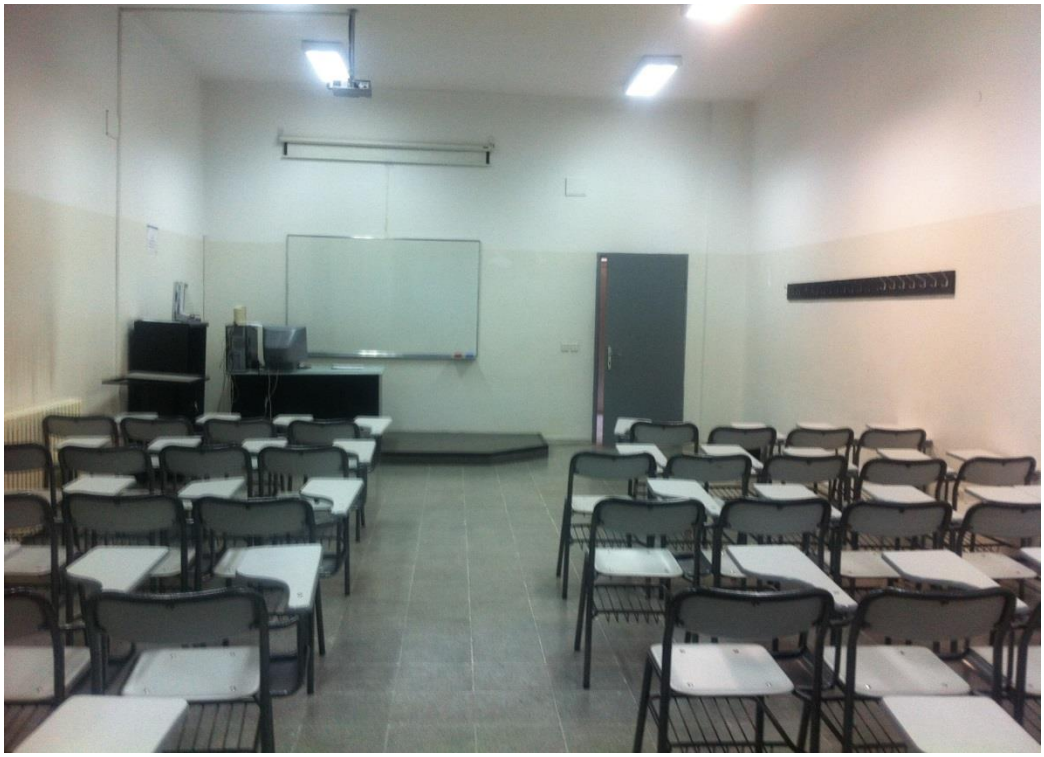
Ghent Altarpiece 15th Century

Rembrand, Danae, 1606-1669

Titian, Venus of Urbino, 1538

Appendix C4. The Case Study: Photos of the Observation

Photos of traditional row arrangement



Students are listening to lecture.

Group work – activity session

Photos of U- Shape arrangement

Students are listening to lecture (First session; deep U- Shape arrangement.

Group work – activity session

APPENDIX D

Appendix D. The Case Study: The Questionnaire

The Evaluation of Effects of Different Seating Arrangements on Learning Experience and Territoriality in terms of Students Perspective

This questionnaire aims to gather field research data for evaluation of "Effects of Different Seating Arrangements on Learning Experience and Territoriality." The interviews are conducted in Bilkent University, Interior Architecture and Environmental Design, FA 171 Art and Culture I class. The information which is given will not be shared or not used for another purpose.

Personal Questions:

1. Personal Information:

   (Name- Surname):

   Age:

   Gender: F M

   ( ) ( )

2. When did you start your education in the department?

3. Have you experienced different types of classroom arrangement in terms of size, shape and layout?

4. What types of classroom arrangements were they?

5. Where did you experience them?

6. Is this first time in Art and Culture classes or not?

YES ☐ NO ☐

7. Do you enjoy Art and Culture classes?

YES ☐ NO ☐

8. Describe yourself in a class on the following scale.

Very Shy				Very Talkative
1	2	3	4	5

Please respond the following questions:

1. I like sitting near other people.

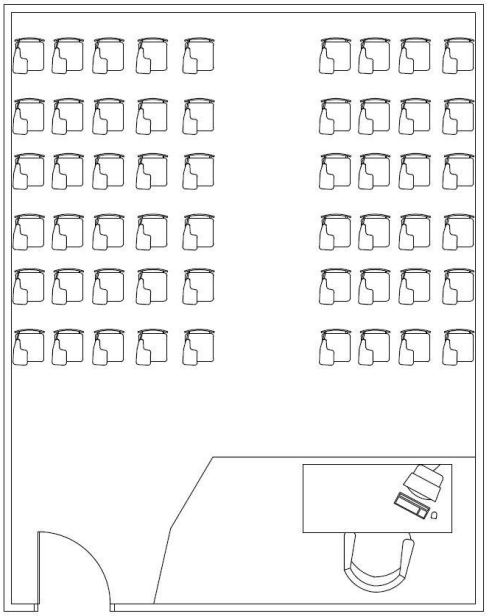
Strongly Agree				Strongly Disagree
1	2	3	4	5

2. I get distracted by the people near me.

1	2	3	4	5

3. Where do you choose to sit?

   Please show in the plan scheme.



Very Good Very Bad

4. How do you feel about the regular class arrangement in terms of attention?

1	2	3	4	5

5. How do you feel about the regular arrangement in terms of concentration?

1	2	3	4	5

6. How do you feel about the regular arrangement in terms of interaction?

1	2	3	4	5

7. Do you think that you are more attentive to course material in Row arrangement?

YES ☐ NO ☐

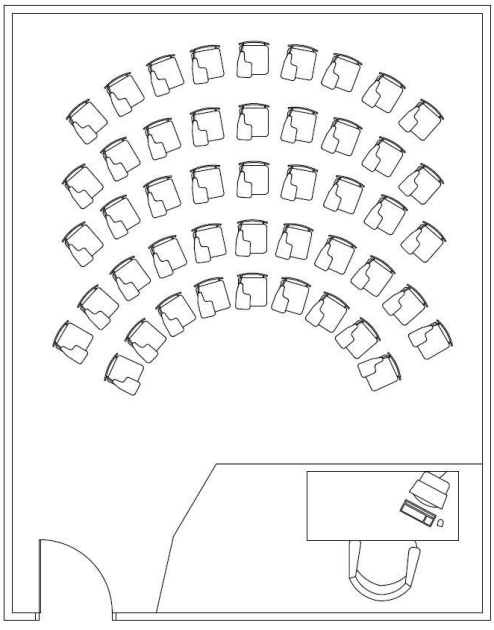
8. What did you think of the changed arrangement when you first walked through the door?

Very Good				Very Bad
1	2	3	4	5

9. How did you choose your place?

10. Where did you choose to sit?

Please show in the plan scheme.



11. How did you feel with the changed arrangement in next times?

Very Good — Very Bad

1	2	3	4	5

12. How do you feel about the U-shape arrangement in terms of attention?

1	2	3	4	5

13. How do you feel about the U-shape arrangement in terms of concentration

1	2	3	4	5

14. How do you feel about the U-shape arrangement in terms of interaction?

1	2	3	4	5

15. What is your impression about the effects of the changed arrangement on the work in class?

1	2	3	4	5

16. Do you think that you have participated more in U-shape arrangement?

YES ☐ NO ☐

17. Do you think that discussions and participation are different in the two arrangements?

YES ☐ NO ☐

18. How they are different?

19. Do you think that your communication with teacher is different in two types of arrangement?

YES ☐ NO ☐

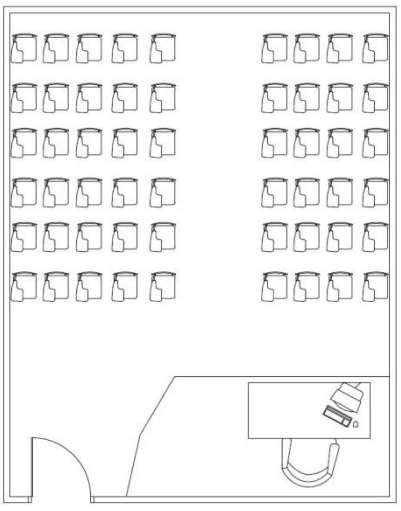
20. How they are different?

21. Do you think that your communication with others is different in two types of arrangement?

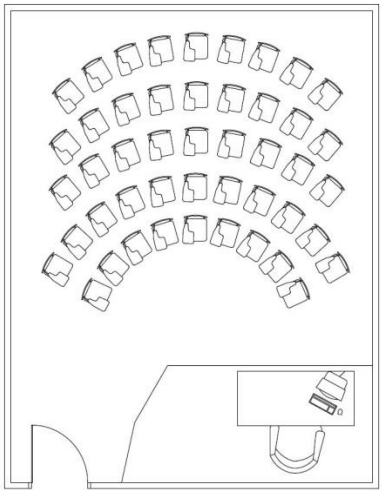
YES ☐ NO ☐

22. Which one of the following seating arrangements do you prefer?

A.



B.



23. Why did you choose this arrangement? Please explain.

24. Additional information:

APPENDIX E

Appendix E. The Case Study: Interview with Instructor: Assist. Prof. Dr. Maya Öztürk (Questions and Response)

1. **What do you think about the effects of physical environment on learning experience?**

- I think it is an important factor. It affects by way of complex environmental features – from the color scheme, materials, or furniture employed, through to light conditions (architectural), and from visual and audio comfort (technical/ equipment), through to comfort features like cleanliness, air ventilation, temperature (use/service/maintenance). These frequently influence in combination, but also are subtle – they may rarely be recognized as pleasant or unpleasant. Overall quality of the learning environment may enliven, stimulate, but also distract, or even depress. ...

2. **Does the seating arrangement affect student's attention concentration and interaction?**

- Actually I think that there should be options – lecture rooms may be designed and equipped so as to accommodate a variety of arrangements. Each type of course such as lecture or seminar type may and should have different kinds of sessions and the teaching-learning activity patterns should vary. In the context of a lecture straight row and orientation to the presentation certainly should enhance attention and concentration. Interaction on the other hand , especially when understood as more

than contact with the instructor, but also among students would require more informal settings, and opportunity for each student be oriented and seeing the others – i.e. be aware of all other participants.

3. **How do you feel about the regular class arrangement in terms of attention, concentration and interaction?**

- Straight row arrangement is more formal, and as lecturer I would prefer it in strictly lecturing sessions. But it is also fixed and impedes other forms of teaching

4. How do you feel about the U- shape seating arrangement in terms of attention, concentration and interaction?

- It would be good to have the chance for re-arranging the space more flexibly for discussions or other collaborative activities. Attention is there among themselves, or if I join into the form it would include me as well. The U- shape is a focused shape already.

- But it does not exhaust all options for flexibility. Even other forms of group work run better in corresponding clusters of 3, 4, 5, etc.

5. **Do you think that your communication with students is different in two types of arrangement? How they are different?**

- The communication is different because the straight row establishes two different and opposite sides, of which the lecture is one. The U-shape is more inclusive and

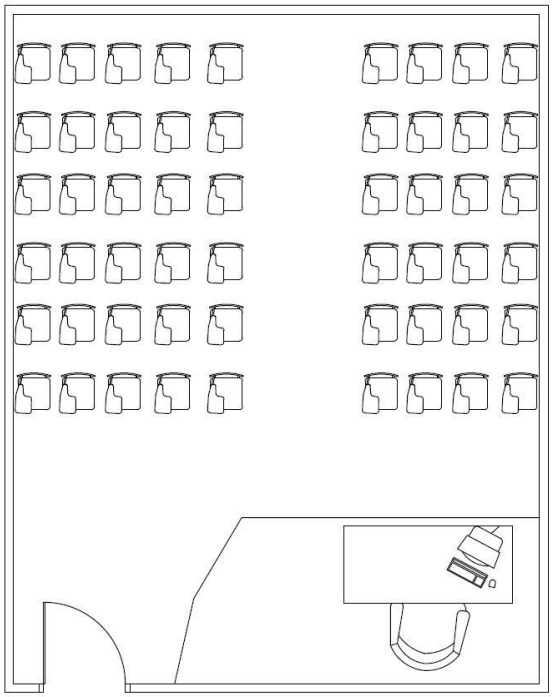
unifying. Especially if everyone is seated, I (and they) may feel more at ease, and working together.

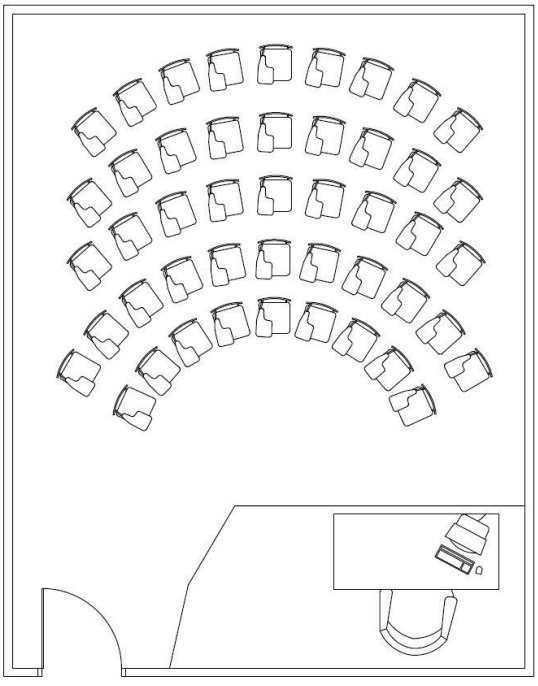
6. **Do you think that students give importance territoriality and personal space? Are they satisfied as learning aspects?**

- In normal lecture sessions there would be some students that persistently stay apart, if possible. Sometimes I notice that they surround themselves with their personal objects and occupy neighboring seats. Others look more content sitting in a cluster with friends. I see forward to finding out how personal space affects in this type of social space for organized collective work – learning.

7. **Which one of the following seating arrangements do you prefer? Why?**

- As I pointed out above I would prefer the possibility of various arrangements, in keeping with the type of collective work that is being done. If there was to be just one arrangement for the rooms we are teaching in I would opt for the U-shape arrangement, but with its focus on the ling side. That would be an optimal choice combining the positive effects of both arrangements.





Additional Information:

Teaching experience – more than 24 years, in a variety of different courses and physical contexts.

APPENDIX F

Appendix F. Statistical Results of the Study

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Spring	19	73,1	73,1	73,1
	Other	7	26,9	26,9	100,0
	Total	26	100,0	100,0	

Table F.1 The percentages of starting department

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	22	84,6	88,0	88,0
	2	3	11,5	12,0	100,0
	Total	25	96,2	100,0	
Missing	System	1	3,8		
Total		26	100,0		

Table F.2 The percentages of experiences of different seating arrangements

Statistics

N	Valid	26
	Missing	0
Mean		2,15
Mode		2

Table F.3 The mean and mode of attention in traditional row arrangement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	23	88,5	92,0	92,0
	2	2	7,7	8,0	100,0
	Total	25	96,2	100,0	
Missing	System	1	3,8		
Total		26	100,0		

Table F.4 The percentages of whether students are more attentive in row arrangement or not.

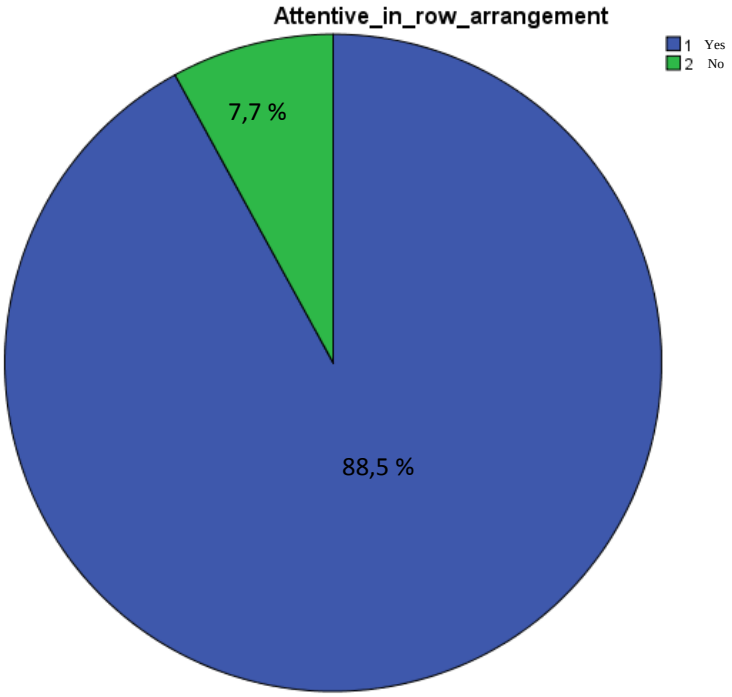


Figure F.1 The percentages of whether students are more attentive in row arrangement or not

Statistics

N	Valid	26
	Missing	0
Mean		2,46
Mode		2

Table F.5 The mean and mode of concentration in traditional row arrangement

Statistics

N	Valid	26
	Missing	0
Mean		2,77
Mode		2[a]

a. Multiple modes exist. The smallest value is shown

Table F.6 The mean and mode of interaction in traditional row arrangement

Statistics

N	Valid	26
	Missing	0
Mean		2,54
Mode		3
Range		3

Table F.7 The mean and mode of changed arrangement at first time

Statistics

N	Valid	26
	Missing	0
Mean		2,35
Mode		2

Table F.8 The mean and mode of changed arrangement in next time

Statistics

N	Valid	26
	Missing	0
Mean		2,38
Mode		1

Table F.9 The mean and mode of attention in U- Shape arrangement

Statistics

N	Valid	26
	Missing	0
Mean		2,42
Mode		1[a]

a. Multiple modes exist. The smallest value is shown

Table F.10 The mean and mode of concentration in U- Shape arrangement

Statistics

N	Valid	26
	Missing	0
Mean		2,27
Mode		2
Range		4

Table F.11 The mean and mode of interaction in U- Shape arrangement

Statistics

N	Valid	26
	Missing	0
Mean		2,46
Mode		3
Range		4

Table F.12 The mean and mode of impression about the effects of U- Shape arrangement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	16	61,5	61,5	61,5
	2	10	38,5	38,5	100,0
	Total	26	100,0	100,0	

Table F.13 The percentages of whether students are more participated in U-Shape arrangement or not

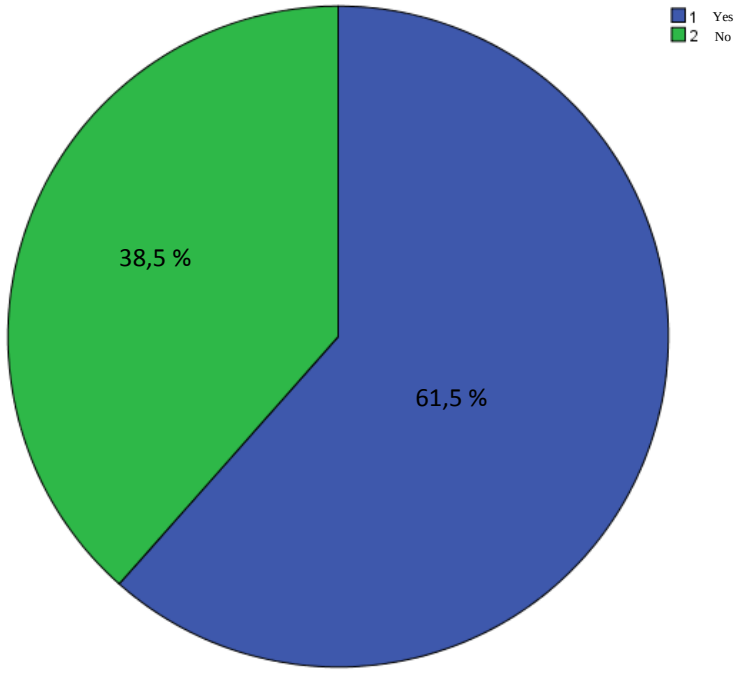


Figure F.2 The percentages of whether students are more participated in U-Shape arrangement or not

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	21	80,8	80,8	80,8
	2	5	19,2	19,2	100,0
	Total	26	100,0	100,0	

Table F.14 The percentages of whether there are differences between traditional row arrangement and U- Shape arrangement in terms of discussion and participation

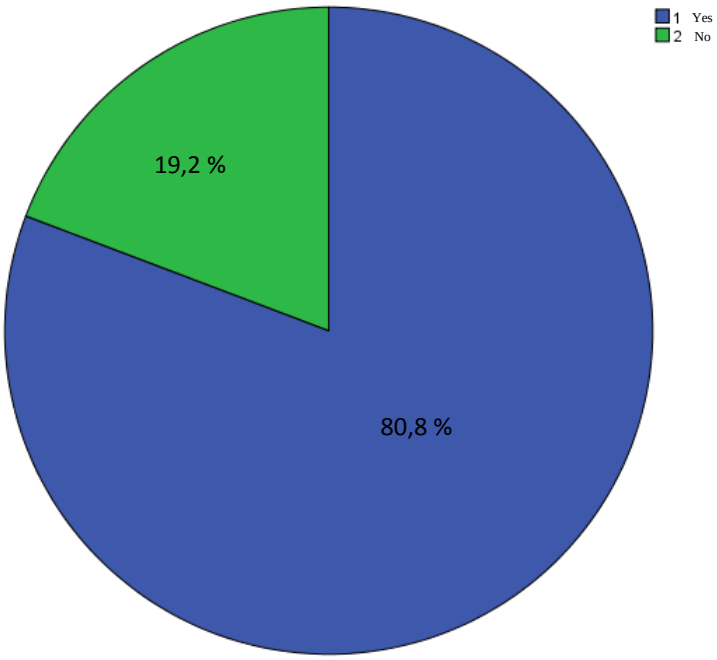


Figure F.3 The percentages of whether there are differences between traditional row arrangement and U- Shape arrangement in terms of discussion and participation

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	19	73,1	73,1	73,1
	2	7	26,9	26,9	100,0
	Total	26	100,0	100,0	

Table F.15 The percentages of whether there are differences in communication with instructor or not

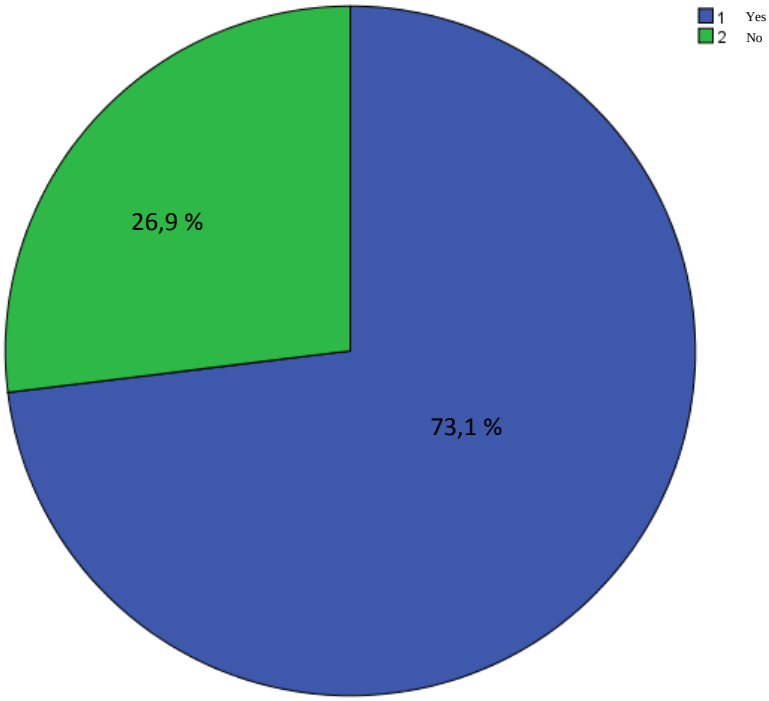


Figure F.4 The percentages of whether there are differences in communication with instructor or not

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	17	65,4	65,4	65,4
	2	9	34,6	34,6	100,0
	Total	26	100,0	100,0	

Table F.16 The percentages of whether there are differences in communication with other students or not

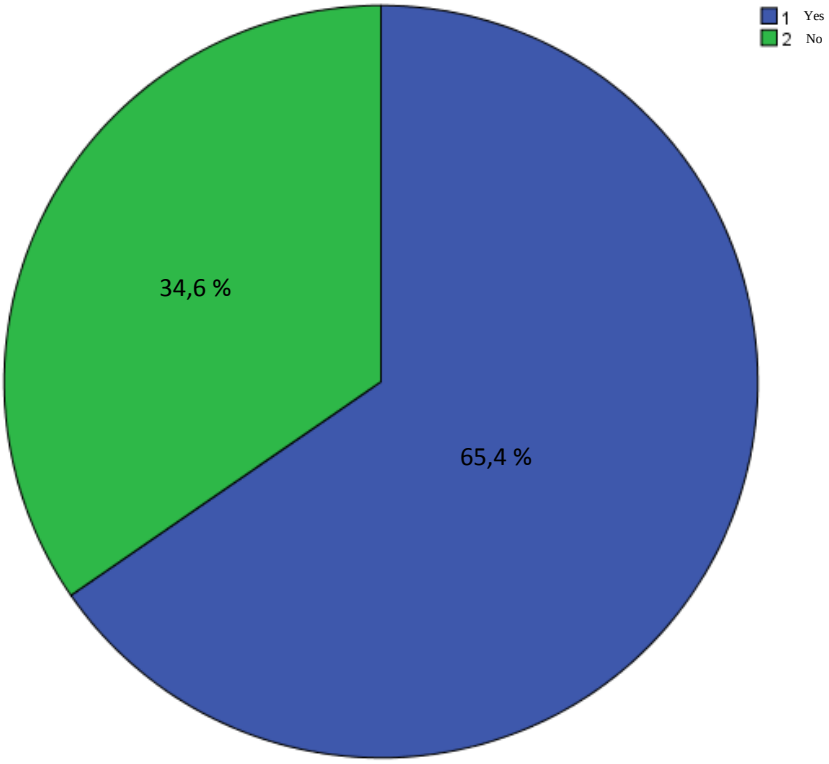


Figure F.5 The percentages of whether there are differences in communication with other students or not

Statistics

N	Valid	26
	Missing	0
Mean		3,00
Mode		3

Table F.17 The mean and mode of seating preference in traditional row arrangement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	12	46,2	46,2	46,2
	2	14	53,8	53,8	100,0
	Total	26	100,0	100,0	

Table F.18 The percentages of location choice in traditional row arrangement

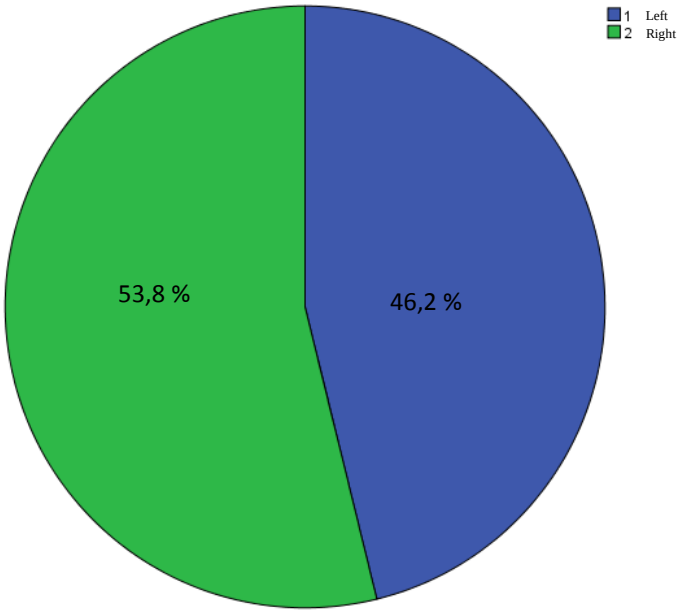


Figure F.6 The percentages of location choice in traditional row arrangement

Statistics

N	Valid	26
	Missing	0
Mean		2,58
Mode		3

Table F.19 The mean and mode of seating preference in U-Shape arrangement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	5	19,2	19,2	19,2
	2	3	11,5	11,5	30,8
	3	18	69,2	69,2	100,0
	Total	26	100,0	100,0	

Table F.20 The percentages of location choice in U-Shape arrangement

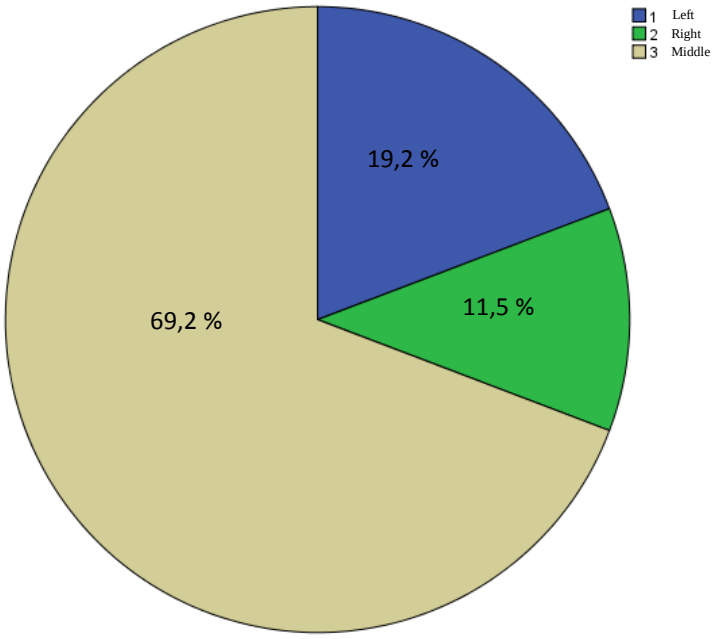


Figure F.7 The percentages of location choice in U-Shape arrangement

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	13	50,0	50,0	50,0
	2	13	50,0	50,0	100,0
	Total	26	100,0	100,0	

Table F.21 The percentages of seating arrangement choice

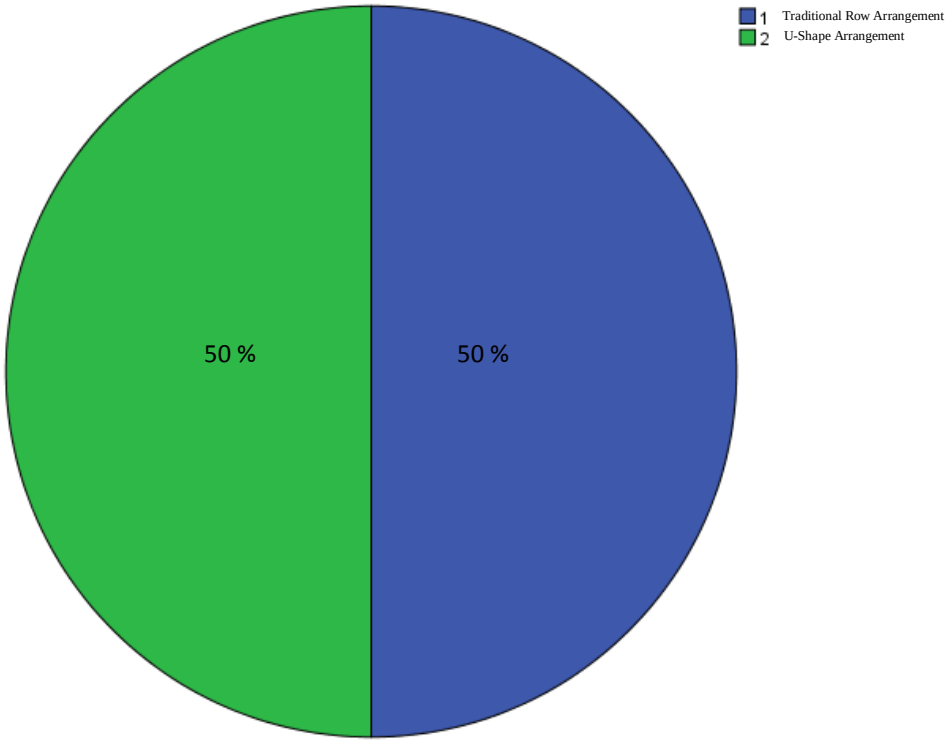


Figure F.8 The percentages of seating arrangement choice