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AN INVESTIGATION INTO THE IMPACT OF MATCHED LEARNING AND TEACHING STYLES ON STUDENT SUCCESS IN ELT PREP CLASSES

MA THESIS

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ABSTRACT

This study investigated the relationship between students' perceptual learning styles and time preferences, and instructors' teaching styles at prep classes in the department of English Language Teaching at Çanakkale Onsekiz Mart University. The purposes of the study were, (a) to examine the effect of the matched learning and teaching styles on academic achievement, (b) to determine the relation between students' time preferences and their success in terms of school hours for both Day and Evening Classes.

The study was conducted through quantitative research methodology. In order to achieve the aims stated above, the data were collected from 46 students and 6 instructors' of prep classes in the ELT Department at Çanakkale Onsekiz Mart University, by means of a Learning Style Questionnaire and Teaching Style Questionnaire. To test the difference between learning and teaching styles in terms of matched ones, the exemption exam scores which were achieved at the beginning of the fall term, and the students' final exam scores at the end of the spring term, were considered as pre-test and post test scores. The obtained data were analysed by using descriptive statistics, Pearson Product Moment Correlation Coefficient, and ANOVA techniques on SPSS 10.0.

Descriptive statistics showed that most of the EFL students preferred to receive information through kinaesthetic and visual learning styles while instructors predominantly preferred to use auditory and visual teaching styles. Although the pre-test scores of the students increased in post-test exam, when the case is investigated by means of matched learning and teaching styles only auditory and kinaesthetic learners' exam scores had improved significantly in the courses whose instructors predominantly preferred auditory and kinaesthetic teaching styles. For the other matched learning and teaching styles, there was not any significant relationship.

Moreover, it was found that both students and instructors were more energetic and ready for learning and teaching in the morning hours, although ANOVA analysis did not reveal an effect of students' preferences for study hours on their success.

This study concluded that matched learning styles and teaching styles might have a positive effect on academic achievement but the concept of matching is not the only factor in being successful as there are a number of other considerations, which affect language learning.

ÖZET

Bu çalışma, Çanakkale Onsekiz Mart Üniversitesi İngilizce Dili Eğitimi bölümündeki hazırlık sınıfında okuyan öğrencilerin; algısal öğrenme üslupları, ve zaman tercihleriyle; bu sınıflarda ders veren öğretim elemanlarının öğretme üslupları arasındaki ilişkiyi incelemektedir. Çalışmanın iki temel amacı bulunmaktadır. Birincisi, öğrencilerin öğrenme üslupları ile öğretmenlerin öğretme üsluplarının uyuşmasının, öğrenci başarısı üzerine etkisi araştırmak; ikincisi, öğrencilerin öğrenme açısından zaman tercihleri ile okul başarıları arasındaki ilişkiyi okula gidiş saatleri (birinci öğretim ve ikinci öğretim) açısından incelemektir..

Bu çalışma nicel araştırma yöntemleri kullanılarak gerçekleştirilmiştir. Yukarıda belirtilen hedeflere ulaşmak için, İngiliz Dili Eğitimi Bölümü hazırlık sınıflarında okuyan 46 öğrenciye, ve bu sınıflarda ders veren 6 öğretim elamanına, Öğrenme Üslubu Belirleme ve Öğretme Üslubu Belirleme anketleri uygulanarak veriler toplanmıştır. Öğrenme üslupları ile öğretme üslupları arasındaki farkın uyuşan üsluplar açısından etkisini ölçmek için güz dönemi başında yapılan muafiyet sınavı ile bahar dönemi sonunda yapılan final sınavı sonuçları kullanılmıştır. Elde edilen veriler, tanımlayıcı istatistikler (descriptive statistics), Pearson korelasyonu (Pearson Product Moment Correlation), ve ANOVA teknikleri kullanılarak SPSS 10.0 istatistik programı ile analiz edilmiştir.

Tanımlayıcı istatistik sonuçları, yabancı dil (İngilizce) öğrenen öğrencilerin en çok yaparak ve görerek öğrenmeyi tercih etmelerine rağmen, öğretim elamanlarının en çok duyumsal ve görsel öğretme üsluplarını kullanmayı tercih ettiklerini göstermiştir. Muafiyet ve final sınavı ortalamaları her ders için artış gösterse de; bu artış öğrenme ve öğretme üsluplarının uyuşması acısından incelendiğinde; sadece duyarak ve yaparak öğrenen öğrencilerin, ders elemanının yoğunlukla bu üsluplara uyan öğretim tekniklerinin kullanıldığı derslerdeki notlarında bir atış olduğu ortaya çıkarılmıştır. Diğer öğrenme ve öğretme üsluplarının uyuşmasının öğrenci başarı üzerinde bir etkisi olmadığı tespit edilmiştir.

Öğrencilerin ve öğretim elamanlarının daha çok sabah saatlerinde öğrenme ve öğretme konusunda daha enerjik ve hazır oldukları sonucuna ulaşılmıştır. Ancak öğrencilerin zaman tercihlerinin öğrenci başarısını o kadar etkilemediği sonucuna ulaşılmıştır.

Bu çalışmanın sonucunda öğrenme ve öğretme üsluplarının uyuşmasının öğrenci başarısını etkileyebileceği ancak üslupların uyuşması öğrenci başarısını etkileyen tek faktör olmadığı ve daha bir çok faktörün olduğu sonucuna ulaşılmıştır.

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"Success is getting what you want.
Happiness is wanting what you get."
-- anonymous--

TO MY FAMILY AND TO THOSE WHO BELIEVED IN ME

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CHAPTER I
INTRODUCTION

1.0. INTRODUCTION

This chapter firstly presents a brief description of the background of the study. It then states the purpose of the study and the general and specific research questions addressed in this study. Next, it gives a brief description of the significance of the study, its assumptions, and limitations. The chapter finally ends with the organization of the thesis.

1.1. BACKGROUND OF THE STUDY

Students learn in a variety of different ways – by seeing and hearing; touching and acting; reasoning logically and intuitively; and memorizing. Teaching methods also diverge. Some instructors lecture, others demonstrate or discuss; some focus on rules and others on examples; some emphasize memory and others understanding. How much a student learns in a class depends on that student's native ability and prior preparation but also the compatibility of his or her characteristic approach to learning and the instructor's characteristic approach to teaching.

Throughout the history of teaching foreign/second languages, teachers and researchers have made many enquiries about the individual differences that affect learning and found many factors that influence learning. Learning style is one of them. Although it is often used in the psychology of education, many traditional educators do not have much knowledge about it nor pay attention to it and teach the students in ways which students use in gaining knowledge. However, there may be mismatches between his or her teaching style and students' learning styles, which may cause problems.

Serious mismatches may occur between the learning styles of students in a class and the teaching style of the instructor, with unfortunate potential consequences (Felder & Silverman 1988; Lawrence 1993; Oxford et al. 1991). The students then tend to be bored and inattentive in class, do poorly on tests, get discouraged about the course, and may conclude that they are no good at the subject of the course and give up. Many examples of this may be come across at the educational environment. For example, a student may be successful in mathematics and foreign language whereas he/she has poor grades in biology and history. Is this student very clever at the first two school subjects but less clever in the others? Moreover, how can a student become unsuccessful following a change of teacher yet he/she was successful the year before in the same school subject? The key point may be hidden in the matching of the teaching style of the teacher and the learning styles of the student. Instructors, confronted by low-test grades, unresponsive or hostile classes, poor attendance, and dropouts, may become overly critical of their students (making things even worse) or begin to question their own competence as teachers (Felder & Silverman 1988; Oxford et al. 1991; Smith & Renzulli 1984).

In the process of learning, there is always a partner, or at least there is an interaction such as the teacher at school, course book, or classmates. Success at school and learning ability depends on the harmony or disharmony of the two brain models. If the recalling models in the two brains know each other and interact, the subject can be simply recorded in the memory and then recalled easily. Intelligence, which means to keep records in the memory and the ability to combine the records and regulate them, is not always on the same side as success at school. That is why there have been many scientists, and leaders, who failed at school (Frederic 1997).

Learning Style is one of the strongest ways to individualize language learning. There is not any effective or ineffective learning style (Schroeder 1996). The essential object is to teach every student via his or her most appropriate learning style. It is obvious that each person has a different process of gaining knowledge thus a different learning style. Instructors should know that all students have different learning abilities and should teach their classes with a teaching style that provides the

best environment for the students. Research shows that students learn a subject at different rates and with strikingly different levels of completeness (Lowman 1990). Instructors cannot be held responsible for the differences in ability students bring with them into our classrooms, but they are responsible for motivating their students, and for making sure that they become involved in learning (Cole 1982).

The basic tenet of learning style theory is that, just as personality is unique to an individual and can be measured psychometrically, so too can learning style (Laing 2001). Each person has a preferred way of perceiving and then utilizing knowledge. Learning will be easier when there is a strong correlation between the way in which new material is presented to us and our learning preferences. Conversely, we will find learning more difficult when there is a large disparity between our learning style and the mode of learning. Knowing our learning style will help us develop a strategy for learning. When presented with material that is alien to our natural learning style, we will then be able to compensate to facilitate adequate learning.

As the importance of learning styles became accepted by educators, much research has been done about it in many countries. The research has been done in many areas since learning styles depend on personal differences described as "cognitive", "affective", and "physiological" traits (Keefe 1979). These are stable indicators of how learners perceive, interact with, and respond to, the learning environment and others such as sex, cultural environment, age, the school (private or state) or even the lessons which learners failed more than once. Learning styles have been extensively discussed in the educational psychology literature and specifically in the context of language learning by Oxford and her colleagues (Oxford 1990; Oxford et al. 1991; Wallace and Oxford 1992; Oxford & Ehrman 1993), and over 30 learning style assessment instruments have been developed in the past three decades.

Researchers have prepared different learning style inventories in order to examine one factor or more than one at one time. For example, research with US schoolchildren (R. Dunn 1983, 1984; Reinert 1976) has demonstrated that learners have four basic perceptual channels (or modalities):

1. Visual Learning: reading, studying maps, graphs, and charts.
2. Auditory learning: listening to lectures, oral reading, choral reading, and listening to recorded books.
3. Kinaesthetic learning: experimental learning, that is, total physical involvement with a learning situation.
4. Tactile learning: "hands on" learning, such as building models, playing board games or doing laboratory experiments.

The findings of Dunn and colleagues verify that most students do correctly identify learning strengths, particularly when an element is strongly preferred or rejected (Dunn 1983, 1984). Dunn and Dunn found that only 20-30% of school age children appear to be auditory learners, that 40% are visual, and that the remaining 30-40% are tactile/kinaesthetic, visual/tactile, or some other combination. Elements like sound, light, motivation, etc., which is extremely important to a person, is called a strong preference. Research indicates that someone with a strong preference for sound would learn, study, concentrate or remember more easily with music in the background; while someone who needs quiet would find it difficult to learn with any kind of sound present (Dunn 1983).

Investigations into good and poor readers show that high reading achievers were more self-motivated, responsible, and preferred learning alone (Wingo 1980). Moreover Carbo (1983), investigating the perceptual style of readers, found that good readers prefer to learn through their visual and auditory senses while poor readers have a strong preference for tactile and kinaesthetic learning. Researchers who have investigated the sex difference have demonstrated that males prefer visual and tactile learning significantly more than females. There is much work on learning style that shows us that the learning style of the learners affect their success.

Kinsella (1995) identifies numerous different aspects of learning styles within the five different dimensions she proposes. To her, the environmental aspect involves our preference for quality and quantity of lighting, sound, temperature, and design structures of the learning environment. The physical dimension reflects our

perceptual strengths (i.e. visual, auditory, tactile, and kinaesthetic), preference for time of study and type of posture, mobility, and food and drink intake during study. Emotional features involve affective elements such as motivation, persistence, and self-confidence. The sociological aspect represents whether one prefers studying independently or in pairs or groups, while the psychological dimension corresponds to what is usually referred to as cognitive style (e.g. Reid 1995), such as lateral preferences (left/right brain hemisphericity), and analytic-global (analytic-relational).

As Kinsella (1995) has identified, briefly, there are many other factors influencing learning. The preference of time to study is one of them. The physical needs of each person are different from one other. Some prefer to deal with difficult subjects early in the morning, some feel better in the afternoon after having lunch, and some are fully motivated when the sun sets and they wait the time of night's silence and dark.

One motivation for this study was to challenge that the learning disabilities and under achievements may not be the fact of life. It is every teacher's duty to create a learning environment and use methods of instruction, which match their students' learning styles, and their individual needs and skills during the learning process. There are three uncomfortable truths behind these claims:

1. If students cannot learn the way we teach them, we have to learn to teach them the way they can learn.
2. There are no "learning disabilities", only "teaching disabilities".
3. Students are not failing because of the curriculum; they can learn almost any subject when the instruction is matched with their individual learning style strengths.

1.2. PURPOSES OF THE STUDY AND RESEARCH QUESTIONS

The purpose of this research was to examine the most preferred modality learning style preference of ELT Department students via a questionnaire and then establish which learning style preference is predominantly supported by the teaching style of the instructors at Çanakkale Onsekiz Mart University and investigate whether matching of the learning and teaching styles had a positive affect on students' success or not. This study also aimed to investigate how day and evening students' biorhythmic features affect their learning. Day students start lectures at 8:00 in the morning and finish at 3:00 in the afternoon whereas evening students start at 3:40 in the afternoon and finish at 9:00 in the evening, similarly, instructors' teaching performance at different times of the day was also examined.

RQ1. What are perceptual modality preferences of the participants – auditory, visual, kinaesthetic, or tactile?

RQ2. What are the physical needs of the participants in terms of time – morning, afternoon and evening?

RQ3. What are the teaching styles of the instructors in prep classes in the ELT Department?

RQ4. Which student learning style is mostly supported by instructors' teaching style?

RQ5. Is there a significant relationship between student study hours and their achievement, in terms of their preferences of time?

RQ6. Do the students achieve better understanding and success if there is a matching between their learning style and the instructors' teaching styles?

1.3. SIGNIFICANCE OF THE STUDY

During the last decades, the study of learning styles has become very popular in the field of education and studies on individual differences in general, and on learning styles in particular, have been done in many countries as well as in Turkey (Dunn et al.1989, 1990, 1994, Oxford et al.1991, 1994). Interest in learning a foreign language, mostly English, in our country has been increasing, as Turkey will be a member of the European Community in the future. The necessity of acquiring English as a tool of communication is recognized by both the administration and the public. Therefore, there is a need to discover how one can learn English easily.

As individual differences play an important role in language learning, it is hoped that the findings of this study will lead ELT teachers to develop teaching models in satisfying all the needs of different learners in their classes and will draw the attention of teachers in the field to the concept of "learning style". The findings of this study may also have implications for curriculum design, materials development, and teacher training. Teachers will be likely to make use of the self-assessment instruments introduced in the study and develop new strategies for matching their students' needs with their teaching styles.

1.4. ASSUMPTIONS OF THE STUDY

The study was conducted under the assumption that the matching of the perceptual learning styles of the students and the perceptual teaching styles of the instructors can improve students' academic achievement.

Another assumption was that the physical need of time does not affect pre-adult learners of English so much because they are motivated enough for learning another language.

1.5. LIMITATIONS OF THE STUDY

The limitations of the study are:

1. This study was carried out in prep classes of the ELT department at Çanakkale Onsekiz Mart University and the study was limited to 46 students who constituted one day class and one evening class and also six English language instructors. Therefore, some applications of this study may be limited to EFL students in Turkey.
2. Female students were in majority in ELT classes, so the data collected in the research mostly represents them. This constrains generalization of the results for all learners.
3. As the data were collected from the students who attended the obligatory prep classes, the findings cannot be generalized for all people who are learning English.
4. As the exemption exam and final grades were used in the study, problems of the students on exam days could possibly bias the results.
5. As the exemption and final exams were evaluated by the instructors of these courses, there might be some subjective grades.

1.6. ORGANIZATION OF THE THESIS

There are five chapters in this thesis. Chapter 1 makes an introduction to the study and presents the background of the study. It also explains the purpose of the study and presents the research questions. It emphasizes the significance of the study and gives the assumptions. Finally, the limitations of the study are discussed in this chapter. Chapter 1 ends with a description of the thesis.

Chapter 2 defines what learning styles are by giving brief descriptions by researchers in the field. It continues by describing various dimensions of learning styles. Then the relevant studies conducted on learning styles are exemplified. Next,

theories about matching the learning styles and teaching styles are mentioned and it describes the ways of using learning style theories in language classrooms.

Chapter 3 explains the methodology used in this study. It gives explanations about the purpose, setting, participants, instruments, and procedure of the study and analyses of the data.

Chapter 4 presents the answers to the research questions and discusses the results.

Finally, a summary of the whole study is given in chapter 5. Then, some implications for learners and teachers are presented together with suggestions and limitations for further research.

CHAPTER II
REVIEW OF LITERATURE

2.0. INTRODUCTION

This chapter consists of two parts. The first part starts with the definition of "learning style" and it continues with the various dimensions of learning styles. Then, literature pertinent to learning styles is presented. Finally, studies carried out on learning styles relevant to this study are exemplified.

The second part pertains to matching the teaching styles with the learning styles mentioned in the literature and describes ways of using learning style theories in classrooms. It presents the critiques relating to matching teaching styles and learning styles.

2.1. DEFINITION OF LEARNING STYLE

Teaching English as a second or foreign language (ESL/EFL) has altered tremendously over the past two decades. Curricula, teaching methods, and teaching materials have been developed to meet the changing needs of the ESL/EFL population. In the developing educational system, learning style characteristics have created widespread interest in educational community. Researchers (e.g. Dunn et al.1986; Oxford et al.1992; and Reid et al.1987) have developed various learning style paradigms by investigating the learning process in terms of individuals' accustomed ways of learning. Researchers interested in the area of learning styles have different opinions concerning what they can call a learning style, or what kind of learning styles exist. Despite controversy over definitions, learning styles is a major concern among scholars in the field.

The reason that there are so many definitions of learning styles among the field is that the theory of learning styles depends on the human being, which is the most multifaceted item in the world, and the uniqueness of each individual. In view of this fact, it is difficult to reach a common definition for the concept of learning styles. However, a fairly comprehensive definition comes from Richards and Lockhart (1996:59), defining learning styles as;

> "characteristic cognitive and psychological behaviours that serve as relatively stable indicators of how learners perceive, interact with and respond to the learning environment ... and can, hence, be thought of as predispositions to particular ways of approaching learning and are intimately related to personality types"

A learning style is described as a set of factors, behaviours, and attitudes that facilitate learning for an individual in a given situation. Reiff states in his work that it is evident that people learn differently and at different paces because of their biological and psychological differences (Reiff 1992). Naturally, these differences in learning abound in any ESL/EFL setting where students come from different cultural and educational backgrounds. Similarly, for Keefe (1979:4) learning styles are:

> "cognitive, affective, and physiological traits that are relatively stable indicators of how learners perceive, interact with, and respond to the learning environments".

Dunn et al. (1989 as cited in Clenton 2002:56) assert that learning styles include variables such as:

> "individual responses to sound, light, temperature, design, perception, intake, chronobiological highs and lows, mobility needs and persistence, ... motivation, responsibility (conformity) and need for structure ...".

Another categorization was made by Kinsela (1995). To her, learning style is multidimensional. Its elements can be classified into five stimulus categories:

- environmental elements (sound, light, temperatures, and design)

- emotional elements (motivation, persistence, and responsibility)
- physical elements (perception, intake, time, and mobility)
- sociological elements (self, partner, team, mentor, varied)
- psychological elements (global/analytical, impulsive/reflective)

Clearly, learning styles include not only the cognitive domain, but also the affective and physiological domains (Oxford, Hollaway, Horton-Murillo 1992).

Another tentative definition of learning style could be *a learner's overall approach to learning,* his or her typical and consistent way of perceiving and responding to learning tasks. How does this definition relate to other important, related concepts such as *personality* or *learning strategies?* One might visualize these complex relationships in this way (Fig. 1: based on Dunn's onion pellicle theory).

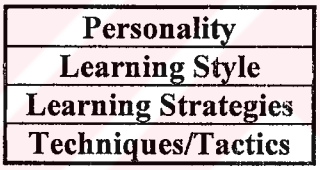

Figure 1: ***Levels of the Learning Process***

At the top, *personality* might be placed - the very general basic individual character structure. Further down the line we meet *learning styles* - how personality works in a learning context, for example in the classroom; styles reflecting the individuals' consistent and preferred learning approach, an approach which he or she exhibits time and time again in a wide range of situations and contexts - and not necessarily in school contexts. A person's style affects the kinds of *learning strategies* that he or she will use - in other words, if you tend to prefer certain strategies on a rather permanent basis, this means that you are probably using a particular learning style. Finally, a learning strategy consists of a cluster of *tactics* or *techniques,* this being the only visible level, which we see when we look at what a learner actually does in the classroom.

Thus, the definitions provided above vary in terms of scope and depth. The involvement of such a wide repertoire of dimensions while defining learning styles leads to confusion because it is difficult to control and focus on all of them at the same time. Therefore, in this study only the perceptual learning styles (visual, auditory, kinaesthetic, and tactile), and the physical element of time, are taken into consideration.

2.2. FUNDAMENTALS OF LEARNING STYLES

Reid (1995) asserts that learning styles have some fundamental characteristics, on which they are based. These are:

- "Every person, student and teacher alike, has a learning style and learning strengths and weaknesses;
- Learning styles exist on wide continuums; although they are described as opposites;
- Learning styles are value-neutral; that is, no one style is better than others (although clearly some students with some learning styles function better in a US school system that values some learning styles over others);
- Students must be encouraged to teach to "stretch" their learning styles so that they will be more empowered in a variety of learning situations;
- Often, students' strategies are linked to their learning styles;
- Teachers should allow their students to become aware of their learning strengths and weakness". (Reid, 1995: xiii)

2.3. LEARNING STYLE DIMENSIONS

It has been proposed that the concept of learning style is multidimensional, (Kinsela 1995). Oxford and Anderson (1995), report that learning styles have six interrelated aspects. As one can see in Figure 2, they are *Cognitive, Executive, Affective, Social, Physiological,* and *Behaviouristic.*

Figure 2: ***Aspects of Learning Styles***

Cognitive Aspect	Includes preferred patterns of mental functioning
Executive Aspect	Includes the ways learners manage, order, and organize their own learning processes
Affective Aspect	Includes beliefs, attitudes, and values that influence learners' focus in learning situations
Social Aspect	Includes learners' preferences to learn either in groups or individually
Physiological Aspect	Includes learners' perceptual preferences
Behaviouristic Aspect	Includes the extent to which learners look for situations which suit their learning preferences

Oxford and Anderson (1995)

In addition to Oxford and Anderson's (1995) report, Willing (1998) explains the cognitive dimensions as an individual's preferred pattern of mental functioning. The affective aspect in a learning style represents patterns of attitudes and interests that influence the amount of attention to be paid in a learning situation. The physiological dimension reflects partly 'anatomically – based sensory and perceptual' preferences of learners (Oxford et al. 1992). Finally, the behavioural dimension explains the tendencies of learners to seek situations compatible with their own learning patterns.

On the other hand, there exist other models of classification of learning style types: The Myers-Briggs Type Indicator (MBTI), Kolb's Learning Style Model, Hermann Brain Dominance Instrument, and lastly, The Felder-Silverman Learning Style Model (Felder 1996).

The Myers-Briggs Type Indicator (MBTI) is based on Jung's theory of psychological types and it divides students into introverts-extroverts, sensors-intuitors, thinkers-feelers, and judgers-perceivers. The MBTI was given to 1.5 million people in 1986 and the results showed that among them 70% were extroverts and 30% were introverts, sensors constituted 70% and the rest, 30%, were intuitors (Jung, 2000). As for thinkers and feelers, 70% of women were reported to be feelers while 70% of men were thinkers. These types can interweave to form one of 16

learning style preferences. For example, one student can be ESTJ (extravert, sensor, thinker, and judger) while another one may be ISFP (introvert, sensor, feeler, and perceiver). Jung (2000) considered these preferences genetic and therefore hard to change.

Introverts tend to be concentrated on their inner world, ideas, and feelings. They are usually quiet, imaginative and seek harmony with their inner world (Felder 1996; Jung 2000). They tend to connect all chunks of information together to see the whole picture in learning (Brightman 2000). Extroverts prefer interaction with people and therefore they are sociable, outgoing, interested in people and seek harmony with the external world (Felder 1996; Jung 2000). They learn by explaining the others (Brightman 2000).

Sensing learners are practical, detail-oriented, and prefer facts, and rules. Intuitive learners, as the name implies, rely on their intuition, focus on meanings and possibilities, and go beyond the facts (Brightman 2000; Felder 1996; Jung 2000).

Thinkers rely on logic and analysis whereas feelers rely on human values while making decisions (Felder 1996). Learners who base their judgments on analysis, logic, and principle are considered to possess a thinking learning style. They like clear, precise, and action-oriented objectives in learning. On the other hand, feeling students value harmony and make their judgments basing them on human values. They like working in small groups because they are, as a rule, good at persuasion (Brightman 2000).

People, who like deadlines and plan their work, focus on completing the task and take action quickly, are judgers. They only want to know the basics of things without going further. At the same time, people who are curious, spontaneous, and tend to postpone assignments to seek more data or relevant information, are called perceptive (Felder 1996, Jung 2000).

Kolb's Learning Style Model reveals students' preferences in each of the two modes: first, in the way they take in information (abstract or concrete), and second, in the way they internalize information (active or reflective). The four following types have been distinguished. *Concrete, reflective* learners, who need to know how the material relates to their experience, their interests, and future careers. *Abstract, reflective* learners, who prefer getting information in an organized and logical way and need time to reflect on given material, *Abstract, active* learners like to learn actively and have clear tasks. They seek opportunities to try things out; that is why guided practice and feedback are needed for them to become effective learners. *Concrete, active* learners like discovering new things themselves and try to apply the material to solve real problems (Felder 1996).

The Hermann Brain Dominance instrument (HBDI) identifies students' preferences for thinking in four brain zones. According to Felder (1996) they are:

- Quadrant A (left brain, cerebral). People who are Quadrant A dominant tend to be logical, analytical, critical, and rely on facts.
- Quadrant B (left brain, limbic). Quadrant B dominant people are sequential, organized, planned, and like details.
- Quadrant C (right brain, limbic). These people are emotional, sensory, interpersonal, and kinaesthetic. Hence, they like teamwork and communication with other people.
- Quadrant D (right brain, cerebral) People who are visual, holistic (appreciate the whole picture rather than details); creative at problem solving and sensitive to innovations are considered to be Quadrant D dominant.

The Felder-Silverman Learning Style Model contains some features of all the previous instruments and classifies learners as sensing or intuitive, visual or verbal, inductive or deductive, active or reflective, sequential or global.

In this model, Felder (1996) classifies learners into the following types:

Sensing (concrete, practical, fact-oriented) or *Intuitive* (innovative, theory oriented); *Visual* (prefer learning visually with the help of pictures, diagrams or flowcharts) or *Verbal* (prefer written or spoken presentation of material); *Inductive* (who like learning specific details first and then proceed to the general notions) or *Deductive* (who prefer learning general concepts first and then proceed to the specific); *Active* (learn best by trying things out and working with others) or *Reflective* (learn via thinking things through and like working independently); *Sequential* (like to learn gradually, step by step) or *Global* (need to have a general picture; they prefer learning in large steps).

There is another learning style model, The Dunn and Dunn model, in which learning styles are presented as students' reactions to five main stimuli (Whitefield 1995). They are environmental, emotional, sociological, physical, and psychological. The reactions to environmental stimuli depend on students' biological makeup (sight, hearing, temperature), which usually cannot be changed, whereas students' emotional preferences do change over the course of time through all kinds of experiences at home, outdoors, or at school. Students' sociological preferences relate to whether students like to learn alone or in a group and whether studying in a variety of ways helps them to learn the given information. Physical stimuli have to do with students' learning through their senses and identify learners as visual, auditory, tactile, and kinaesthetic. Finally, students react to psychological stimuli according to differences in brain functioning. These are what contribute to individual learning style differences among different people (Whitefield 1995).

Reid (1996) distinguishes six significant learning style groups. She reports that the most widespread group is visual learners, who prefer seeing words (text visual) or pictures (picture visual) in books, on the chalkboard, or on handouts. Then comes the group of auditory learners, who prefer hearing words and oral explanations, reading information aloud, listening to lectures and audiotapes, and participating in class discussions. The group of tactile learners prefers hands-on experiences with materials — building models, touching and working with materials, and note taking. Kinaesthetic learners prefer whole body activities — being

physically involved (in field trips, role-plays, and multiple sense stimuli, for example, an audiotape combined with role-play activity). Learners can also be either *group learners*, who prefer to study and communicate with others to help themselves to learn, understand and remember information or *individual learners*, who prefer to work alone to help themselves learn, understand and remember information. According to Manaeva (1993), these learning styles are referred to as perceptual or sensory learning styles and are considered quite stable in comparison with other dimensions of learning styles.

Most of researchers mentioned about sensory learning styles, as Reid above, as a dimension of learning styles but it would be better to review and discuss it in detail since it is the main concern of this study. Sensory Learning Styles are usually supposed to include:

a) Environmental style, corresponding to learners' preference for quality of sound, light, temperature, classroom design, food intake, time of study and mobility when studying;

b) Sociological style, reflecting our preference for studying in a team, with peers, in pairs, alone and teacher authority;

c) Perceptual learning style, indicating language learners' preferred physical and perceptual learning channels (Reid, 1995).

Students have preferred learning styles that directly influence their ability to assimilate and retain course content. These learning styles can be established using psychometric models. The channels that language learners prefer in reaching knowledge (Kinsella 1995) are usually measured by means of self-report style preference inventories (i.e. Reinert 1976; Dunn, Dunn, and Price 1975, Reid 1987, O'Brien 1990; and Kinsella 1995). Learners are usually classified as visual, auditory, kinaesthetic, and tactile learners according to their perceptual style preferences. The last two aspects of perceptual preferences (kinaesthetic and tactile), however, are sometimes combined by some authors, and called haptic (O'Brien 1990) or hands-on (Scarcella and Oxford 1992).

Students who have visual *strength - preference* like the teacher to provide situations such as creating dialogues or stories from pictures, instructions for drawing dictation, or designing class newspapers and also prefer a teacher who use resources that must be read or seen: the chalkboard, posters, and bulletin boards; books, magazines, and manuals; programmed learning materials; drawings, pictures, graphs, and diagrams; films, filmstrips, transparencies, and computer monitors. They find it easy to learn through descriptions. They often use lists to keep up and to organize thoughts. They often recognize words by sight. They prefer to have written assignments. They often have well developed imaginations. Movement or action in the classroom easily distracts them. They tend to be unaware of noise. Students who are not visual on the other hand often read a page and then realize they do not know what they have read. They then must reread the page. They find it difficult to concentrate on reading assignments or overhead notes.

Students who have *auditory strength - preference* like the teacher to provide verbal instructions who has a good tone of intonations. They find it easy to learn by listening. They enjoy dialogues, discussions, and plays. They often do well working out solutions or problems by talking them out. They are easily distracted by noise and often need to work where it is relatively quiet. Students often do best using recorded books. Students who are not auditory often sit in a lecture and do not really know much of what is being said. They find it difficult to concentrate or listen for long periods of a lecture. They will often tune out what is being said or find it hard to stay with the speaker or lecturer.

Students who have *tactile strength - preference* often do best either when they take notes during a lecture or when reading something new or difficult. They often like to draw or doodle to remember. They do well with hands-on tasks such as projects, demonstrations, or lab works. Students who are not tactile rarely take notes or only for things that cannot be remembered easily such as numerical data. They often do not do well with hands-on and find it hard to concentrate during lab activities.

Students who have *kinaesthetic strength - preference* often do best when they are involved or active. These students often have high energy levels. They think and learn best while moving. They often lose much of what is said during a lecture and have problems concentrating when asked to sit and read. These students prefer to do rather than watch or listen. Students who are not kinaesthetic get involved in action-oriented activities. They would rather drive than walk. They would prefer not to participate and to watch. They expect the teacher to a create situation like acting out a story, writing down what the teacher mimes, or classroom dramas.

Some authors prefer to combine the last two aspects (tactile and kinaesthetic) of perceptual learning style as they both involve, to some extent, some physical contact with the learning experience. A definition of this combination is provided by O'Brien (1990 as cited in Erten 1998:86), she describes haptic learners as athletic, creative, musical, impulsive, artistic, disorganised, and intuitive. Their typical behaviour is to move a lot, make messy notes, study with music, fix things, need frequent breaks, learn best by doing, use fingers to count, and not follow directions.

The current study also focuses on the element of environmental style of the time of study: morning hours, afternoon & evening hours. Some researchers say that both environmental and physical elements of learning style are biological; they are genetically imposed by nature. However, they do vary at different stages of life, but the rate at which they develop or change is said to be related directly to the individuals' maturation and physical condition. We all are aware of "early birds and night owls', and people with either high or low energy levels at different times. Learners have their own preferences of time when they feel themselves better or fully motivated in dealing with a difficult subject or learning a new item. No matter when a class is in session, it is the wrong time of day for some of the population.

Nearly twenty different dimensions of learning styles have been identified so far. Table 2 provides a summary of the various dimensions together with their brief definitions. When the table is analyzed carefully, it can be seen that though some of the definitions are given separately, they actually overlap. An example of such

overlap is the "field independent – field dependent" versus "analytic and global" learning styles.

Table 1: *Overview of some Learning Styles (Reid 1998: x).*

	The Seven Multiple Intelligences
Verbal / Linguistic	Ability with and sensitivity to oral and written words
Musical	Sensitivity to rhythm, pitch and melody
Logical / Mathematical	Ability to use numbers effectively and to reason well
Spatial / Visual	Sensitivity to form, space, colour, line, and shape
Bodily / Kinaesthetic	Ability to use the body to express ideas and feelings
Interpersonal	Ability to understand another person's moods and intentions
Intrapersonal	Ability to understand oneself: one's own strengths and weakness
	Perceptual Learning Styles
Visual	Learns more effectively through the eyes (seeing)
Auditory	Learns more effectively through the ear (hearing)
Tactile	Learns more effectively through touch (hands – on)
Kinaesthetic	Learns more effectively through complete body experience
	Social Learning Style Preferences
Group	Learns more effectively through working with others
Individual	Learns more effectively through working alone
	Field Independent and Field Dependent (Sensitive) Learning Styles
Field Independent	Learns more effectively sequentially, analysing facts
Field Dependent	Learns more effectively in context (holistically) and is sensitive to human relationships
	Analytic and Global Learning Styles
Analytic	Learns more effectively individually, sequentially, linearly
Global	Learns more effectively through concrete experience and through interaction with other people
	Reflective and Impulsive Learning Styles
Reflective	Learns more effectively when given time to consider options
Impulsive	Learns more effectively when able to respond immediately
	Kolb Experiential Learning Model
Converger	Learns more effectively when able to perceive abstractly and to process actively
Diverger	Learns more effectively when able to perceive concretely and to process reflectively
Assimilator	Learns more effectively when able to perceive abstractly and to process reflectively
Accommodator	Learns more effectively when able to perceive concretely and to process actively
	Myers-Briggs Type Indicator (MBTI)
Extraverted	Learns more effectively through concrete experience, contacts with and relationships with others
Introverted	Learns more effectively in individual, independent learning situations
Sensing	Learns more effectively from reports of observable facts
Intuition	Learns more effectively from meaningful experiences
Thinking	Learns more effectively from impersonal and logical circumstances

Feeling	Learns more effectively from personalised circumstances
Judging	Learns more effectively by reflection, deduction, analysis, and processes that involve closure
Perceiving	Learns more effectively through negotiation, feeling, and inductive processes that postpone closure
	Right and Left -- brained Learning Styles
Right-Brained	Learns more effectively through visual analytic, reflective, self- reliant learning
Left-Brained	Learns more effectively through auditory, global, impulsive, interactive learning

2.4. RESEARCH STUDIES ON LEARNING STYLES

Research concerned with identifying the relationship between academic achievement and individual learning style has provided consistent support for the following (Lynch 198; Dunn, Cavanaugh, and Zenhausern 1982; Dunn, Krimsky, Murray, and Quinn 1985; Lemmon 1985; Dunn, DellaValle, Dunn, Geisert, Sinatra, & Zenhausern 1986):

a) Students do learn differently from each other;

b) Student performance in different subject areas is related to how individuals learn;

c) When students are taught with approaches and resources that complement their unique learning styles, their achievement is significantly increased

In addition to the research documentation substantiating the positive effects that occur when students are taught in ways that are responsive to how they each learn, widespread practitioner corroboration has been published based on classroom or school wide experiences (Caruthers & Young 1979; Gardiner 1983; Lemmon 1985; Dunn & Griggs 1988).

To reduce teacher-student style conflicts, some researchers in the area of learning styles advocate teaching and learning styles be matched (e.g. Griggs & Dunn 1984; Smith & Renzulli 1984; Charkins et al. 1985), especially in foreign

language instruction (e.g. Oxford et al. 1991; Wallace & Oxford 1992). Kumaravadivelu (1991:98) states that: "... the narrower the gap between teacher intention and learner interpretation, the greater is the chance of achieving desired learning outcomes". There are many indications (e.g. Van Lier 1996; Breen 1998) that bridging the gap between teachers and learners' perceptions plays an important role in enabling students to maximize their classroom experience.

In order to match the styles, educators should investigate students' learning style but it is not always easy to reach a conclusion since learning styles have a wide range of dimensions and many variables affect them. There are several problems proposed by Tyacke (1998) encountered while identifying learning styles.

1. Learning styles are complex in nature and it might be difficult to analyse the overall learning profile of a learner.
2. Learners might tend to use different learning styles in various learning contexts.
3. The methodology used in the transfer of information can be biased.

That is, it might be in favour of one kind of learner (analytic) over another (global). Yet researchers have worked on and identified several learning styles in relation to variables such as age, sex, length of time in the target culture, field of study, level of education, and culture. Moreover, Ellis (1989:260) highlights the difficulties involved in determining learning style due to the "absence of reliable and valid instruments". He also stresses the fact that within any one group of learners, there is bound to be a range of styles.

Reid (1987) conducted a study with respect to the learning style preferences of ESL learners. The overall results of the research indicated that ESL learners strongly preferred kinaesthetic and tactile learning styles when compared to audio and visual. In addition, most groups showed a negative preference for group learning.

The general findings offered by Reid (1987) are as follows:

1. The perceptual learning style preferences of ESL learners differed significantly in several ways from native speakers of English. For instance, native speakers of English were less tactile in their learning style preferences than all non-native speakers and were significantly less kinaesthetic than Arabic, Chinese, Korean, and Spanish speakers.

2. The learning style preferences of ESL learners from different language, educational, and cultural backgrounds sometimes differed significantly from each other. For instance, Korean students were found to be the most visual in their learning style preferences. They were significantly more visual than the US and Japanese learners. Japanese learners, on the other hand, appeared to be the least auditory of all learners and were significantly less auditory than Arabic and Chinese learners.

3. When other factors such as sex, length of time spent in the United States, major field, and level of education were analysed, the results indicated that there were significant differences in their relationships to various learning style preferences. In the analysis of results with respect to level of education and gender, it was found that graduate students showed a significantly greater preference for visual and tactile learning than the undergraduates did. The undergraduates were significantly more auditory oriented than graduates. Both groups strongly preferred kinaesthetic and tactile learning. Males preferred visual and tactile learning significantly more often than females.

4. The data obtained from the study also indicated that as ESL learners adapt to the US academic environment, some change and extension of learning styles might take place. To illustrate, the longer the students had lived in the United States, the more auditory their preference became. Learners who had been in the US more than three years were significantly more auditory in their learning style preference than those who had been in the US for shorter periods. This finding indicates that

learners adapt their learning style preferences to the learning environment they are involved in.

Stebbins (1995) replicated Reid's (1987) study in order to obtain more information about the similarities and differences in learning styles between ESL learners and Native English Speakers (NESs). Stebbins lists the areas in which his results paralleled Reid's results.

- "Kinaesthetic and tactile learning styles were strongly preferred by ESL students when compared to NESs.
- Group learning was again chosen as the least preferred mode by most NESs and ESL students; the only sample group in the current study to indicate a preference for the group learning mode were those ESL students with low (300-349) TOEFL scores.
- Spanish speakers repeated their strong preference for the kinaesthetic mode.
- Arabic and Korean students showed stability in their choice of multiple learning styles.
- Japanese students again did not strongly identify any style preferences".

(Stebbins 1995:110)

Cheng and Banya (1998) conducted a study in which 140 male freshman learners at the Chinese Military academy completed seven questionnaires including Perceptual Learning Style Preference. The questionnaire was also completed by Taiwanese teachers lecturing at Taiwanese universities. The results obtained from the self-reported surveys revealed that the Taiwanese military students did not have significantly different preferences for any single learning style. The teachers, on the other hand, reported being significantly less visual and more auditory than the learners.

Based on the data obtained from the perceptual learning style self-reports, it was discovered that both the teachers and learners preferred the perceptual learning styles of auditory, tactile, and individual learning. A significant finding of the Cheng and Banya study was the difference between teachers and learners' auditory

preferences. The teachers were markedly more auditory than the learners. The learners, on the other hand, showed significantly greater visual preference by reporting that they learned more by reading textbooks than by listening to lectures.

Cheng and Banya also provide further information revealed because of the statistical analysis of the perceptual learning style questionnaire. Their findings include the following:

- "Students who preferred kinaesthetic learning have more confidence as well as more positive attitudes and beliefs about foreign language learning than students with other perceptual learning style preferences.
- Students with the individual preference style use more language learning strategies, and they are less tolerant of ambiguity.
- Students who identified themselves as tactile learners seemed to be more anxious about learning English.
- Students with an auditory preference like to make friends with and speak with foreign language speakers (in this case, English speakers)".

(Cheng and Banya 1998: 82)

Another study conducted by Davis, Nur, and Ruru (1994) revealed that majority of the 103 students in the sample (68 individuals, or 66 percent) as learners who were predominantly visual. Either these had a clear visual preference, or visual was so closely combined with another preference that the difference was not significant.

One of the first correlational studies that revealed a relationship between academic achievement and preferences for learning at a given time during the day was conducted by Clara Amelia Murray (1980). While comparing the learning styles of seventh- and eighth-grade low-achievers in a public middle school, she discovered that many of the female low achievers preferred learning in the evening, whereas male counterparts were afternoon preferents. Those initial data suggested a need to further examine the relationship between biologically based time preferences and school achievement.

Within the next five years after Murray's Study, at least nine separate investigations examined the learning styles of various multicultural groups (Dunn & Griggs 1990). Among the findings were those:

a) Asian college students preferred early-morning learning significantly to Caucasians,

b) Mexican-Americans shared an early-morning preference with Asians but disliked afternoon learning (Sims 1988; Dunn, Gemake, Jalai, Zenhausern, & Quinn 1990),

c) Later in the day was preferred by Caucasian, African-American, and Creek elementary students (Dunn, et al. 1990).

Later studies of gifted and talented adolescents in Brazil, Canada, Egypt, Guatemala, Israel, Korea, the Philippines, and the United States revealed that less than 10 percent were morning preferents; most preferred learning in the late morning and afternoon, and some were evening preferents (Milgram, Dunn & Price, 1993).

As a result of a correlational study, Gadwa and Griggs (1985) reported that high-school dropouts in the state of Washington were self-, peer- and collegial / teacher-motivated, needed a great deal of variety when learning, and preferred evening as their optimal time for learning; they had difficulty learning in the morning.

As an outcome, Lynch (1981) analyzed the relationship between time-of-day preferences and the English achievement of chronically truant eleventh- and twelfth-graders. He found that students achieved significantly higher test scores, and were absent significantly fewer times, when their English course periods matched their preferred time. In addition, having had extensive experience with low auditory/low visual learners, Gardiner (1986) experimented with Multi-Sensory Instructional Packages (MIP) with fourth-grade underachievers at specific times of the day. Significantly higher social-studies test scores resulted with MIP versus traditional instruction and during afternoon, rather than morning teaching.

Another study done by Virostko (1983), whose purpose was to examine the relationships among class instructional schedules, time preferences, and grade level, and their effect on the mathematics and reading achievement test scores of third, fourth, fifth, and sixth graders. This research:

(a) substantiated which of the 286 subjects were either matched or mismatched for time preference and instructional schedule during each of two consecutive years of study;

(b) assessed whether individually or interactively, the three independent variables (Time preference, class instructional schedules for each of two years, and grade level) significantly affected the two dependent variables (NCE achievement test scores in mathematics and reading).

The findings revealed that:

a) Students whose time preferences and class schedules were congruent achieved significantly higher test scores;

b) When time preferences and class schedules were dissonant, lower scores were evidenced.

Thus, this investigation demonstrated that class instructional schedules, which coordinated with individual time preferences, were the most significant factors responsible for increasing achievement test scores in both mathematics and reading at the .001 level of confidence.

Moreover, time-of-day energy levels change with age. Only 28% of elementary-school students have early-morning energy highs. Most "come alive" after 10:00 in the morning and are most alert between 10:30 A.M. and 2:00 P.M.--during which time they are assigned a one-hour lunch period. At the middle-school level, no more than 30% are early-morning preferents; and, by high school, the morning group has increased to 40%. However, at that level, at least 13% are "night owls" and the majority learns best in the late morning and afternoon (Dunn & Dunn 1992; 1993; Dunn, Dunn, & Perrin 1994).

2.5. MATCHING INSTRUCTION TO LEARNING STYLES

As a response to teachers' frustration in failing to meet the needs of the wide variety of students in the classroom, educational leaders have searched for many years for alternative instructional approaches or methods. One of the newly developed approaches claiming to meet the wide range of individual differences among students is the "learning style" approach.

2.5.1. WAYS OF USING LEARNING STYLE THEORIES IN CLASSROOMS

How can learning style theories be used in classrooms? According to Guild (cited in Brandt 1990), there are broadly three different approaches to applying learning style theories in the classroom. One is focusing on the individual; know yourself and the other person you are interacting with. Guild regards "personal awareness" as an important aspect of learning style theory. In her opinion, "it is very important for educators when working with other people to understand both their own and the other's perspectives" (Brandt, 1990:10). Another aspect of learning style is application to curriculum design and the instructional process. It is now well known that people learn in different ways, so educators can use a comprehensive model that provides for adapting instruction to the major learning differences. The third approach, she mentions, is diagnostic/prescriptive; this involves key elements of an individual's learning style, and, as far as possible, matching instruction and materials to those individual differences.

Friedman and Oxford (1984), on the other hand, observe more or less the same aspects of learning styles approach when trying to draw up principles of application from research in the field.

The first principle they suggest that it is possible to identify both students' and teachers' learning/teaching styles. Dunn (1990), Keefe & Ferrell (1990) and

others have demonstrated the feasibility of classroom applications of learning style instruments. However, there has been less research in the area of teaching styles than in learning styles. Nevertheless, there are instruments developed by Gregorc in 1977 and Entwistle in 1981 for identifying teachers' preferred styles for teaching (Friedman and Oxford 1984).

Friedman and Oxford further suggest that teachers are more likely to develop strategies, which are congruent with their own learning styles rather than those of their students if they are unaware of learning/teaching style literature. Teachers have the tendency to think that everybody can learn best in the way they have learned or are learning. From this assumption, Friedman and Oxford imply that teachers must guard against over-teaching by using their own preferred learning styles. Instead, they should broaden their teaching strategies to provide opportunities for students with different style preferences.

The second principle is that teachers should help students in identifying and learning through their own style preferences. Friedman and Oxford find this principle important because "it supports the premise that students are capable of guiding their own learning when given the opportunity" (Friedman and Oxford 1984: 78).

That students should be given, the opportunity to learn through their preferred style in the classroom is the third principle, which, Friedman and Oxford says, "is implicit in the assumptions underlying the learning styles movement" (Friedman and Oxford 1984: 78). However, it is not enough for students to learn only through their preferred styles; they should also be encouraged to diversify their style preferences. "This style flex" they state, "is essential in a complex society which places increasing value on visual or auditory learning but insists that its youth be able to manipulate the computer keyboard with the same facility with which they read a newspaper or listen to a lecture" (Friedman and Oxford 1984: 78). Addressing to this point, Dunn (1990) and Carbo (1990) hold the view that a certain percentage of the school population is tactually or kinaesthetically oriented in their learning

preferences. They also believe that traditional instruction is generally based on audio or visual modalities as primary teaching styles.

The fourth principle Friedman and Oxford (1984) maintain is that teachers can develop specific learning activities that reinforce each modality or style. The degree to which teachers are able to develop teaching activities and materials related to basic styles will largely determine the success of the movement, according to many advocates of the learning style approach.

As will be noticed, Guild (cited in Brandt 1990) and Friedman and Oxford (1984) focus on similar things in terms of application of the learning style approach: personal awareness about learning/teaching styles, adjusting curriculum and instructional processes to the dominant learning styles, matching teaching styles and materials to individual differences, which are important aspects of the learning style paradigm in terms of its application in the classroom.

Is it possible for teachers to respond to students' multiple learning styles in a class with more than 30 students? "Yes" says Dunn (1990:18), it is neither impossible nor difficult to respond to individuals' strengths; one merely needs to learn how". By redesigning a classroom, teachers can address 12 elements of learning style, and that does not take much time - maybe one hour once a semester for a class. Teaching both globally and analytically - every class has both types of processors - eliminates another major problem. By learning how to lecture and simultaneously respond to each student's perceptual strengths, teachers may eradicate another problem. By teaching students to study and do their homework at their best times of day and by scheduling students for their most difficult or most important core subject at their best times of day, teachers can manage that component. Thereby, according to Dunn (1990), it is possible to apply the principles of the learning styles approach in the classroom.

2.5.2. WHY BASE INSTRUCTION ON LEARNING STYLE THEORIES?

Whenever recommendations are made for new ways of doing things in the classroom, the question "why?" is always asked anew: Why is it necessary to modify instructional practices? Will it enhance the effectiveness of teaching or will it simply complicate what might be otherwise smooth running?

According to the style theorists, broad modifications – from tailoring an individual reading program to matching a learner's global approach to allowing students to sit in pairs, individually, or even on the floor - can remove barriers to learning and enhance student achievement. Students are not failing because of the curriculum. Students can learn almost any subject matter "when they are taught with methods and approaches responsive to their learning style strengths" (Dunn 1990: 18). Nevertheless, those same students fail when they are taught in an instructional style dissonant with their strengths.

Many schools that have experimented with approaches to style, using one or a combination of various style models currently available, report that using the technique allows more students to succeed and it weakens the argument that students who misbehave or fall behind academically in traditional classrooms have limited learning ability.

Acknowledging the broad impact of a school-based learning styles program, many advocates (Dunn 1990; Carbo 1990; O'Neill 1990) say that so called "at risk" students, those whose personal behaviour, past educational records, or family problems increase the chance of failure, have the most to gain from style-based learning. In many schools, they say, the lack of alternatives to lecture and text book-based teaching, classroom design, or grouping factors works against under-achieving students.

The students who are regarded as under-achievers or dropouts of the system are most probably those whose styles are mismatched. If students who prefer to study in soft light, in an informal design, or sociologically, or like to study with peers, are put in an environment that does not match their preferences, they are likely to suffer from failure, states Carbo (1983). Likewise, Dunn (1990) believes that classroom design and rules restricting student movement are primary reasons and these students are labelled as under-achievers and problem students. They are problems because they cannot sit and they cannot learn the way they are taught.

2.5.3. SOME CRITIQUES ON THE IDEA OF MATCHING

While the notion of accommodating individual differences clearly appeals to many educators, distressing doubts hinder the widespread integration of style-based instruction according to both advocates (Dunn 1990; Carbo 1990; McCarthy 1990; Keefe & Ferrell 1990) and critics (Curry 1990, Snider 1990; Doyle & Rutherford 1984) of the practice.

A major issue facing those who attempt to use styles theory in the classroom is to what extent teachers can and should match instruction with a student's preferred mode of learning. While some advocates call for a formal instrument to assess a learner's style and prescribe appropriate teaching methods (Keefe & Ferrell 1990; Dunn 1990), others maintain such instruments are unnecessary and may actually lead to students being improperly labelled as one type of learner or another (Snider 1990). In addition, multiple arrangements in classrooms in which separate groups work simultaneously with different materials or equipment are difficult to manage, say Doyle & Rutherford (1984), because, according to them, matching programs typically call for establishing different groups to operate simultaneously, and such a requirement will create a major planning task for teachers, who often have limited time and resources for designing programs. McCarthy (1990), on the other hand, has the idea that teachers have a duty to 'stretch' outside their own style, and that planning lesson content and activities with several broad style types in mind is the

best way to make use of styles theory. He believes that a teacher has a responsibility as a professional to go out of his or her style.

Other researchers like Curry (1990) argue that much of the research evidence being cited is based on doctoral dissertations containing supposed gains from style matching which are short-lived, and that large-scale studies with experimental and control groups are needed to provide a convincing argument that style-based education works. However, the practitioners of style-based instruction, like Brunner and Majewski (1990), Perrin (1990), Sykes and Jones (1990), Carbo (1990), and Dunn (1990) claim that style-based approach in education produces positive gains for students, both in the short term and over the long run.

The way that a teacher handles a learning task is called that teacher's "teaching style" or "instructional style". Claxton and Murrell (1987) state that if the teachers' instructional style and students' learning style match; there is usually a productive environment. However, Even (1982), McCarty (1984) and Steven (1976) show that the students can be taught specific learning strategies and study skills for particular learning tasks, even though their preferred mode of learning does not match the teacher's instructional style.

It is important for a teacher to be aware of the learning style preferences of the students, and of his or her own preferred way of instructing. Adjustments can then be made to accommodate the students needs (Boylan 1984; Whitman et al. 1986) and students can be shown how to become more responsible for their own learning (Gregorc 1979).

Hoover and Connor (2001) report that matching your learning style to teaching style can result in more effective learning and greater academic achievement. Fuller et al. (2000) outlined the Teaching Styles preferences for the MBTI styles and provided suggestions for faculty development for seven of the sixteen MBTI types. Montgomery and Groat 1998 point out that "matching teaching styles to learning styles is not a panacea that solves all classroom conflicts" that

other factors such as the student's motivation, pre-conceptions, and multicultural issues also impinge on the student's quality of learning; nonetheless, understanding and reacting to learning styles in teaching enhances the quality of learning and rewards teaching. Brightman (2000) discusses the four MBTI sections and provides guidance on matching Learning and Teaching styles. Higher-level education motivation normally operates at the Maslow's Hierarchy of Needs 'Cognitive Need' level though the 'Esteem Needs' level and can play an important part (Cotton 1995).

2.6. CHAPTER SUMMARY

This chapter reviewed the literature regarding the different dimensions of learning styles. Some brief explanations were given about the learning styles that were investigated in this study. It also reviewed studies related to the present study. Then, the importance of matching learning and teaching styles was presented and some research findings were discussed.

Having thus finished reviewing the literature, the next chapter concerns the methodology pursued in the present study during the collection and analysis of the data.

CHAPTER III
METHODOLOGY

3.0. INTRODUCTION

This chapter discusses and describes the methodology pursued in the study. First, it focuses on the overall design of the study. Then it presents the research questions and some information about the subjects involved in this study. After that, the data collection instruments along with the data collection procedures are explained. Finally, the analysis of data is provided.

3.1. DESIGN OF THE STUDY

Since the aim of this study was to find the dominant, major, minor, and negligible perceptual modalities of students, and their choice of physical element, and instructors' teaching styles, quantitative methods were employed in order to collect data. The data were collected through two questionnaires, one of which aimed to identify students' learning style preferences and the other aimed to define teachers' teaching style preferences. This study embraces two pilots and one main study. The first pilot study was applied in order to recognise whether the items in the questionnaires (both learning styles and teaching styles) were comprehensible or not. The second pilot study concerned the consistency of the respondents' answers to the questionnaire statements over two months. The total scores for each learning and teaching styles at both times were correlated (see results 3.6).

It is also an analytic-deductive study, which hypothesizes that the matching of student learning styles and instructor teaching styles can affect student success in prep classes in the ELT department at Çanakkale Onsekiz Mart University.

3.2. OBJECTIVES OF THE STUDY

The purpose of this research was to examine the most preferred modality learning style preference in foreign language learning in terms of the styles used in the questionnaire (visual-auditory-tactile and kinaesthetic), and then find out which learning style preference was predominantly supported by the teaching style of the instructors in prep classes in ELT department at Çanakkale Onsekiz Mart University and to investigate whether the matching of the learning and teaching styles had a positive affect on students' academic success or not. This study also aimed to investigate how day and evening students' biorhythmic features affected their learning. As in many of the universities in Turkey, there are day and evening classes where day students start at 8:00 in the morning and finish at 3:00 in the afternoon whereas evening students start at 3:40 in the afternoon and finish at 9:00 in the evening.

3.3. RESEARCH QUESTIONS

RQ1. What are perceptual modality preferences of the participants – auditory, visual, kinaesthetic, or tactile?

RQ2. What are the physical needs of the participants in terms of time – morning, afternoon and evening?

RQ3. What are the teaching styles of the instructors in prep classes in the ELT Department?

RQ4. Which student learning style is mostly supported by instructors' teaching style?

RQ5. Is there a significant relationship between student study hours and their achievement, in terms of their preferences of time?

RQ6. Do the students achieve better understanding and success if there is a matching between their learning style and the instructors' teaching styles?

3.4. PARTICIPANTS

This study took place at the Çanakkale Onsekiz Mart University in prep classes of the English Language Teaching Department and English Language and Literature Department, which offers full-time intensive language training courses for undergraduate students who did not achieve an adequate score in the exemption exam. The data sources in this study were the upper intermediate level students in two classes. There were 46 prep students; 24 of them were day students, and 22 of them were evening students. Their ages ranged between 18 and 21.

Like most other Education Faculty English Language Teaching Departments, the percentage of female students exceeded that of the male students. The proportion of male and female students in these classes was 7 to 39. Therefore, the gender difference was not taken into consideration in this study.

Students principally had similar educational backgrounds. Out of the 25/46 graduated from Anatolian Teacher Training High Schools, which accept students via an exam and then provide extra points for their students if they choose any department of an Education Faculty for their higher education. Another 9 of them graduated from Anatolian High Schools, which accept students by examination; and 12 of them graduated from state schools called Super High Schools, which provide a prep class. In this study, however, how demographic variables influence learning styles could not be taken into consideration.

The ELT department at Çanakkale Onsekiz Mart University accepted students for the day programme with 360.707 average points and for the evening programme with 352.237 average points in the 2003-2004 academic year. The average score of the day students who failed in the exemption exam was 360.875 whereas the average score of the evening students was 353.045. Eleven students were from the English Language and Literature Department, which accepted students with 346.942 average points, while the mean score of the students who failed in the exemption exam was 347.545.

The second group of subjects consisted of six English language instructors whose teaching experience mean was 15.6 years. Out of six, four of them were male instructors and two of them were female instructors. Two of them, one male and one female, were native speakers of English who taught the listening and speaking courses. The Basic English Course and Writing Course were given by the same instructors for both day and evening classes.

3.5. DATA COLLECTION INSTRUMENTS

Instruments used in this study included a learning style questionnaire, a teaching style questionnaire, and an English placement test. Both of the questionnaires consisted of two main parts - perceptual modality preferences and physical needs of the participants in terms of time.

3.5.1. THE LEARNING STYLE QUESTIONNAIRE

When the term "learning styles" is thought, there are many factors influencing someone's learning process and researchers have prepared many questionnaires about the topic. Designing a learning style questionnaire requires defining the objectives of the questionnaire and the theoretical constructs that it aims to measure (Oppenheim 1997). The Learning Style Questionnaire (LSQ: Appendix B) used in this study planned to measure perceptual learning style preferences (visual-auditory-tactile and kinaesthetic) of EFL learners of English, and their preferences of time in two ways (morning hours, and afternoon & evening hours)

The LSQ questionnaire used in this research consisted of three sections: questions about the background of the subjects, instructions, and the statements. The statement part also consisted of two parts: perceptual learning style preferences and choice of physical element of time.

The first part, the Perceptual Learning style questionnaire used in this study was taken from Erten's study (1998) (See Appendix A). It consisted of randomly arranged sets of five statements on four different learning style preferences: visual, auditory, tactile, and kinaesthetic. The reason for choosing this questionnaire was, it was constructed and validated for non-native speakers of English and as Erten (1998) stated in his PhD thesis its content validity was checked by two experts, which entailed reviewing and rewriting the questionnaire items until a 100 % agreement was reached on each item and thus on each subscale. The reliability of the questionnaire was also analysed by employing an internal consistency analysis on SPSS and the overall consistency of the inventory was found to be .8489 on Cronbach's alpha.

Inside the questionnaire, a scoring table was not given in order to prevent to lead students' choices while answering the questionnaire. Nevertheless, the related statements about each learning style preferences were shown in the table below.

Perceptual Learning Style Preferences	**Statement Numbers**
Visual	1 – 4 – 10 – 18 – 26
Auditory	2 – 7 – 11 – 19 – 25
Tactile	12 – 15 – 21 – 22 – 27
Kinaesthetic	5 – 8 – 14 – 16 – 23

The second part, the choice of physical element of time, was about the biorhythm of learners. There were two main sections, which consisted of four statements in each main group (morning hours, and afternoon & evening hours). We all are aware of "early birds and night owls', and people with either high or low energy levels at different times. No matter when a class is in session, it is the wrong time of day for some of the population. The statements were developed in the light of recent literature (e.g. Murray 1980, Sims 1988, Dunn & Griggs 1990, Dunn, Gemake, Jalai, Zenhausern, & Quinn 1990, Dunn, et al. 1990, Milgram, Dunn & Price, 1993) about this topic in order to clarify whether there was a difference between day and evening students depending on their biorhythm or not.

The related statements about morning hour's preferences and afternoon & evening hour's preferences were shown in the table below.

Time Preferences	Statement numbers
Morning Hours	3 – 6 – 24 – 28
Afternoon & Evening Hours	9 – 13 – 17 – 20

3.5.2. THE TEACHING STYLE QUESTIONNAIRE

Like learning styles, there are many factors influencing teaching styles. In order to match the learning styles of the students and the teaching style of the instructors, the teaching style questionnaire was adopted from the learning style questionnaire described in the previous part. After consulting colleagues and experts in the field of language teaching and reading the literature about the topic of teaching styles, Teaching Style Questionnaire was adopted from Learning Styles Questionnaire (TSQ: Appendix C). Nevertheless, another pilot survey carried out with this instrument before using it in research, and it was understood that the instrument appeared to function well in differentiating various teaching style referred to the questionnaire. This questionnaire consisted of two parts including 18 statements, which aimed to differentiate six teaching style preferences of the instructors. The first part was about the perceptual teaching style of the instructors (visual, auditory, tactile, and kinaesthetic). In each sub-scale there were three statements related with these perceptual teaching preferences. The second part was about instructors' preference of time (morning hours, and afternoon & evening hours). There were three statements in each sub-scale about how much instructors were motivated for the courses in the morning, and afternoon & evening classes. Each set of statements were randomly arranged.

Again, inside the teaching Style Questionnaire a scoring table was not given to prevent to lead instructors answers. However, statements for each subscale were shown in the table below.

Teaching Style Preference	Statement Number
Visual	2 – 8 – 14
Auditory	6 – 11 – 17
Tactile	3 – 12 – 18
Kinaesthetic	4 – 9 – 15
Time Preferences	**Statement Number**
Morning Hours	1 – 7 – 13
Afternoon & Evening Hours	5 – 10 – 16

3.5.3. THE ENGLISH PROFICIENCY EXAM

In the beginning of academic year 2003-2004 at Çanakkale Onsekiz Mart University, a proficiency exam was given to the freshmen students of the ELT department. The proficiency exam contains five parts (Grammar, Reading, Listening, Speaking and Writing) and each of these sections have a 20 percent effect on the students' success. Failure to achieve a satisfactory score in the exam results in a student being obliged to enter the prep year to raise his/her level.

The Grammar Exam consisted of four parts. The first part included multiple-choice questions; the second was about identifying mistakes in a standard written English sentence. The third part was a multiple-choice cloze test, and the last one was a productive grammar part requiring students to write the given sentences with a different form but remaining the meaning same.

The writing exam consisted of two parts. The first part concerned writing topic sentences and concluding sentences for the given paragraphs. The second part was about writing a paragraph on a given topic.

The listening exam consisted of three sections. For section one, students listened to people talking in eight different situations and tried to find out the best answers for each conversation from given multiple choices. The second section was about a woman being interviewed about a new product. Students again tried choose

the best answers from the given choices related with the interview. For the third part, students listened to a talk about the protection of animals and decided the given statements were true or false.

The speaking exam was about topics that were given at the time of exam and required students to state their ideas about these topics.

The reading exam consisted of two sections. In the first section, students had to find out the missing paragraphs in an article out of paragraph choices. The second section was involved an article and multiple comprehension questions related to the article.

The English Proficiency Exam was chosen as one of the instruments for measuring achievement because it had already been administered to the subjects seven months before the Final Exam. The Proficiency Exam and Final Exam will be defined as pre-test and post-test from now on. Their results were used to measure the achievement of the subjects in their courses.

3.6. PILOT STUDY

Both questionnaires – LSQ and TSQ – were piloted with 12 fourth year students of the ELT Department before they were administered to the participants of this study. The main purpose of the pilot study was to find out how long it would take to fill in the questionnaires and whether the language and layout of the questionnaires were, appropriate for non-native speakers of English.

The students were asked to complete the questionnaires in two sessions together, and the length of time was tested. The learning style questionnaire took 15 minutes, and teaching style questionnaire took 10 minutes. After completion of the questionnaires, each statement was discussed, whether there were any unclear words

or phrases. Some words, which might cause problems in understanding for non-native students of English, were changed after the discussion.

In order to check the consistency of respondents' answers, LSQ and TSQ were given to the students and instructors over a two-month period. The LSQ and TSQ were administered to the participants of this study at the end of the first term and again in the second term before the mid-term exam in order to preserve the same number of participants. Then the scores of the two questionnaires for each learning style questionnaire were correlated. The following results were found:

LSQ:			TSQ:		
Visual:	.901	p>.001	Visual:	.889	p>.001
Auditory:	821	p>.001	Auditory:	.902	p>.001
Kinaesthetic:	.916	p>.001	Kinaesthetic:	.856	p>.001
Tactile:	.841	p>.001	Tactile:	.870	p>.001
Morning H.:	.812	p>.001	Morning H.:	.874	p>.001
Evening H.:	.853	p>.001	Evening H.:	.861	p>.001

These findings indicated that responses to the both LSQ and TSQ were stable over two months.

3.7. PROCEDURES

The data used in this study were collected in the academic year of 2003-2004. The 46 students studying in the prep class of the ELT department participated in the study. Firstly, the pre-test was given to all the freshmen students at the beginning of the 2003-2004 academic year and the grades of the 46 students who were failed in this exam noted down with the permission of the ELT department administration. The pre-test was given over three days, two exams on the first two days and speaking exam on the last day, in order to prevent the loss of performance in students. After seven months, at the end of the 2003-2004 academic year, the post-test similar to pre-test was given. The purpose of the post-test in fact was to establish whether the

students have attained a sufficient level to enter the first year. The post-test was administered and scored by the same course instructors.

The LSQ and TSQ were given to the students and the instructors at the beginning of the spring term. First, the students had to fill out the background section of the questionnaire to acquire information about their age, gender, type of the school they attended, whether they studied in prep class at high school or not, their score in university entrance exam. The researcher expected to get enough information to see whether there would be any other factors that could influence students' learning styles and whether they had a similar educational background or not.

The subjects were informed about the purpose of the survey and were asked to respond on a voluntary basis to statements in the Learning Style Questionnaire. They were supposed to give answers to the statements using a five – points Likert Scale (Oppenheim 1997) from "strongly agree" to "strongly disagree". They were informed in advance that the questionnaire was designed to help students and the researcher to understand better, how they gained information and there were no right or wrong answers. Students were also told they should respond to the statements without discussing their answers with classmates, told not to think so much about each statement and choose the one, which was appropriate to them at first sight. To increase the credibility of the responses, subjects were told that they could ask anything they wanted by raising their hands. The students were also assured that they could ask questions in Turkish and receive explanations in Turkish.

The instructors completed the Teaching Style Questionnaire individually at the beginning of the spring term in the same room with the researcher in order to supply any help they needed while answering the questionnaire. It took ten minutes to complete TSQ, which had 18 statements in it.

3.8. ANALYSIS OF THE DATA

The results of the pre-test and post-test were calculated by the course instructors, as explained in the instruments section, and the results were compared according to the learning styles of the participants and the teaching styles of the instructors.

Before calculation of the scores for each set of statements on The Learning Style Questionnaire, an interpretation chart was designed. The Learning Style Questionnaire was a 28-item inventory, which comprised two main parts (perceptual learning style preferences, and choice of physical element of time) and six sub-categories (visual, auditory, tactile, and kinaesthetic; and morning hours, and afternoon & evening hours. The first four sub-categories included five items each with a five-point Likert scale (Oppenheim 1997). The maximum possible score for each sub-scale is therefore 25 whereas the minimum is five. To understand students' learning preferences for gaining knowledge, this range was divided into four different ranges of strength of preferences.

RANGE	INDICATION
21------25	Dominant
16------20	Major
10------15	Minor
05------09	Negligible

SCORES 21 AND ABOVE: Scores in this range represent your DOMINANT learning style(s). Given a learning situation where you can use your own natural learning pattern(s), you will use this/these styles.

SCORES BETWEEN 16 AND 20: Scores in this range represent your MAJOR learning styles preference(s), indicating learning modes you find yourself comfortable using in learning new things, even if they are not a "natural" style for you.

SCORES BETWEEN 10 AND 15: Scores in this range represent your minor learning style preference(s). You can learn using these minor styles, but they will be your second choice given a chance to use a MAJOR preference. You may use these MINOR learning styles alone, but you are more likely to use them in combination with your major preference(s).

SCORES BETWEEN 05 AND 09: Scores in this range represent-learning preferences of NEGLIGIBLE usefulness to you in trying to learn things. Trying to learn using style preferences in this scoring range would make learning both difficult and very uncomfortable for you personally.

For the other main group, the preference of physical element of time, there are two sub-categories: morning hours, and afternoon & evening hours. Each sub-category includes four items each with a five-point Likert scale (Oppenheim 1997). Thus, the maximum possible score for each sub-scale is 20 whereas the minimum is five. The scores between 16 and 20 were accepted as a strong preference and between 11 and 15 were accepted as a medium preference of time. Scores between 05 and 10 were accepted as a weak preference of time.

RANGE	INDICATION
16------20	Strong
11------15	Medium
05------10	Weak

For identifying the instructors' strongest preferences in their teaching styles, the same procedures were followed. However, another scale was used to find out dominant preferences due to the number of the statements being different from the Learning Style Questionnaire. For each part, there were three statements for each sub-scale. Therefore, the maximum possible score for each sub-scale was 15 whereas the minimum could be 5. Consequently, scores between 11 and 15 were accepted as the instructors' dominant preference and scores between 7 and 10 were accepted as a medium preference. Scores between 3 and 6 was accepted as weak preferences.

RANGE	INDICATION
11------15	Strong
7------10	Medium
03------6	Weak

Students whose dominant learning style preferences were similar to those of their instructors' teaching style preferences were identified. The means of their mid term and post-test scores were compared to the pre-test and the researcher attempted to find out the whether there was a positive relationship between the academic achievement of these EFL learners, and learning, and teaching styles. The Statistical Package for The Social Sciences (SPSS 10.1) was employed to analyse the data.

3.9. CHAPTER SUMMARY

This chapter presented the methodology utilised in this study. First, the design of the study and the objectives of the study were presented. Second, the participants, setting, and data collection instruments were described and the rationale for using a questionnaire design was provided. Next, the rationale for the pilot study was stated. Then the process of designing a Learning Style and a Teaching Style Questionnaire, and the procedure that was followed were presented. Finally, this chapter described the process of data collection and statistical analysis of the data.

CHAPTER IV
RESULTS AND DISCUSSION

4.0. INTRODUCTION

This chapter presents the findings obtained from the statistical analysis of the data collected from the participants. These findings will be reported in three parts. The first part of this chapter will present the distribution of perceptual modality preferences and the physical need of time of the students involved in this study. For the second part, the distribution of instructors' teaching style preferences will be presented. In the last part, the findings of the first two parts will be compared by means of the pre-test and post-test scores.

4.1 Part 1: DISTRIBUTION OF PERCEPTUAL MODALITY PREFERENCES and PHYSICAL NEED OF TIME OF STUDENTS

The main goal of this study was to observe whether the students achieve better understanding and have academic success if their learning styles (the ones used in LSQ) are matched with their instructors' teaching styles. In order to measure the learning and teaching styles, subjects were applied The Learning and Teaching Style Questionnaires, which were designed for the purpose of this study. SPSS 10.0 program was used in the data analysis. Depending on the data provided by these questionnaires, the results obtained in relation to the research questions follows.

4.1.1. PERCEPTUAL MODALITY PREFERENCES OF THE STUDENTS

RQ1. What are perceptual modality preferences of the participants – auditory, visual, kinaesthetic, or tactile?

The learning style questionnaire was applied to 46 students in two prep classes of the ELT Department at Çanakkale Onsekiz Mart University. One part of the questionnaire aimed to measure preferences for visual, auditory, tactile, and kinaesthetic perceptual learning styles. The tabulation of the students' responses to the questionnaire items in each learning style sub-scale provided their preferences for the different perceptual learning styles. Table 2 presents the mean totals for each dimension of perceptual learning style.

Table 2: ***Descriptive Statistics on the Use of Perceptual Modality Preferences of the Students***

	N	Minimum	Maximum	Mean	Std. Deviation
Kinaesthetic	46	16,00	25,00	21,0217	2,1238
Visual	46	14,00	25,00	20,9130	2,4388
Tactile	46	12,00	24,00	19,1957	3,0523
Auditory	46	11,00	24,00	18,4783	2,6976

The analysis showed that the students were inclined towards a kinaesthetic modality [mean = 21, 0217] followed by visual modality [mean = 20, 9130], tactile modality [mean = 19, 1957] and auditory modality [mean = 18, 4783]. When the findings were compared to previous studies, (e.g. Dunn 1984, Reid 1987, Stebbins 1995, Cheng and Banya 1998), they found to be more or less the same. For example, Stebbins (1995) stated that EFL learners have a tendency to prefer a kinaesthetic learning style as their dominant/strongest style while the auditory style is preferred the least. The total mean of the kinaesthetic and visual preferences was very close to each other. This can be explained in the context of the Turkish education system. Most teachers of English use visual objects and role-plays in the language classrooms, which provide opportunities for those kinds of learners. Opposite to this,

teachers of other courses do not use much those teaching materials and activities in their classrooms. Figure 3 illustrates the students' preferences for visual, auditory, tactile, and kinaesthetic perceptual modalities.

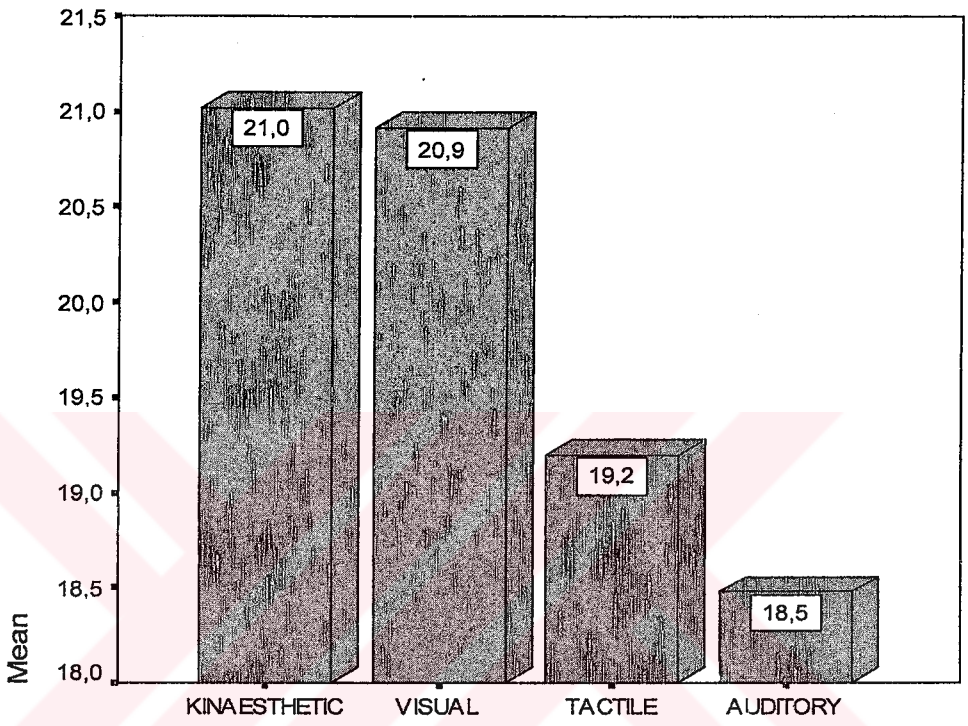

Figure 3: ***Modality Learning Style Preferences of the Subjects***

Our major concern in this study was to find out whether similarities and dissimilarities between the students' learning styles and the instructors' teaching style had a positive influence on students' success or not. In order to analyse this, it was found necessary to present the preferences of the individual student and calculate the dominant, major, minor, and negligible preferences of each. Some students might have more than one dominant perceptual learning style preference (e.g. Nur, Davis, and Ruru 1994, Stebbins 1995, Tyacke 1998). In revealing the dominant perceptual learning style preferences, a scale (explained in section 3.8) was used. With the purpose of comparing similarities and dissimilarities in students' perceptual learning style preferences with the instructors' teaching style, only dominant perceptual learning style preferences were taken into consideration.

When the distribution of these learning styles(see Appendix D) was examined throughout the two classes; out of 46 subjects, 33 students (71.7 %) turned out to be dominant kinaesthetic, 28 students (63 %) were dominant visual learners, 21 students (45.6 %) were dominant tactile learners and 7 students (15.1%) were dominant auditory learners. Most of the subjects reported having a combination of styles, which was why the percentages added up to more than 100% (See Table 3). This confirms the findings of some previous studies (Reid, 1987, O'Brien 1990, Kinsella 1995, Erten 1998). Rossi-Le (1995) discovered that older and more proficient language learners preferred learning visually because the more students are exposed to the written word, the more comfortable they feel learning visually (cited in Oxford and Anderson, 1995). Since our subjects were freshmen students who had taken a very difficult university entrance exam, they may have developed preferences for gaining knowledge through different perceptual channels.

Table 3: ***Distribution of Students' Dominant Perceptual Learning Styles***

Dominant Perceptual Learning Style	Number	Percentage
Kinaesthetic Preference	33	71.7
Visual Preference	28	63
Tactile Preference	21	45.6
Auditory Preference	7	15.1
Total	89	195.4

4.1.2. PHYSICAL NEED OF THE PARTICIPANTS IN TERMS OF TIME

RQ2. What are the physical needs of the participants in terms of time – morning, afternoon and evening?

To find out the subjects' most preferred physical element of time, the subjects were asked 8 questions in the Learning Style Questionnaire, 4 of them related to a

preference for morning hours and the other 4 about a preference for afternoon & evening hours. Table 4 presents the mean totals for time preferences of students.

Table 4: ***Descriptive Statistics of Time Preference***

Time Preference	N	Minimum	Maximum	Mean	Std. Deviation
Morning Hours	46	6,00	20,00	13,9783	3,5745
Afternoon & Evening Hours	46	6,00	19,00	12,3043	3,0047

The mean total for each subscale of the physical element of time indicated that most students tended to be more energetic and motivated for learning in the morning hours [mean = 13.9783], and the other students had a tendency to study in the afternoon and evening hours [mean = 12.3043]. This can be explained by their prior educational life, in which the students used to go to school in the morning hours. In addition, as Dunn and Perrin (1994) state in their study about the change of preference of time, students become more morning hours oriented as they grow up. Figure 4 illustrates time preferences of students.

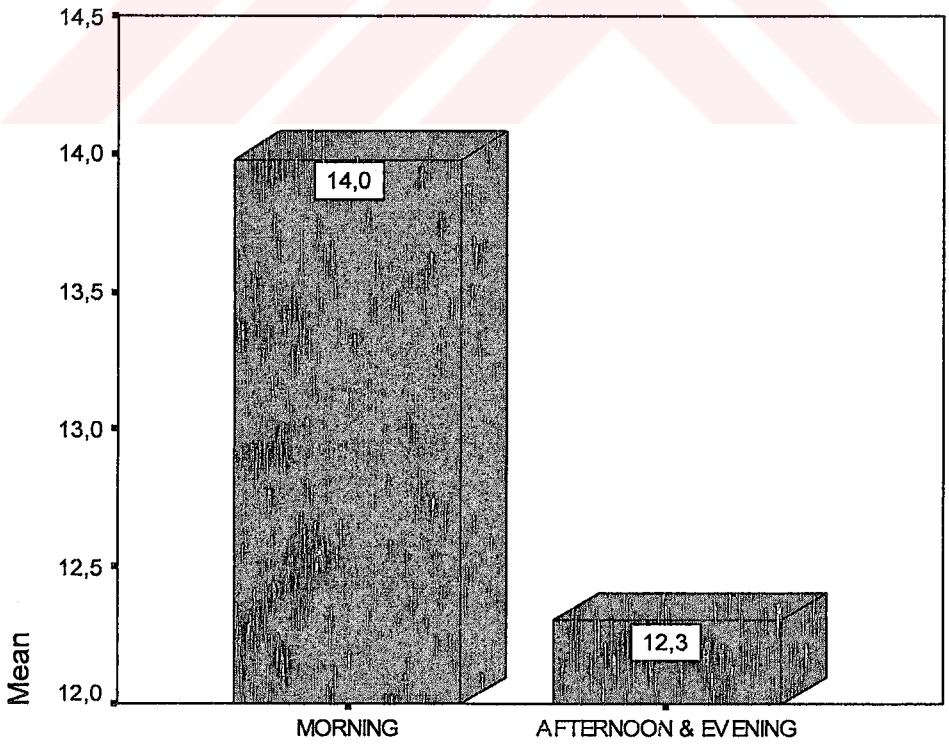

Figure 4: ***Mean Values of the Preference of Time***

The data obtained from those statements would be used in comparison of the day and evening students' academic performance. The 24 subjects involved in his study were day students in the ELT Department and 22 of them were evening students. The first step in this comparison was to calculate each student's strong preference of time, using the scale described in section 3.8.

When the distribution of the time preferences of the students (see Appendix E) was analysed by means of the scale that was defined in section 3.8; as seen in Table 5, out of 46, 23 students (50 %) tended to have a strong preference for morning hours and 11 students (23.9 %) tended to have a strong preference for afternoon & evening hours. As presented in Appendix E, 12 students (26 %) had a medium preference for both the morning hours and afternoon & evening hours. This can be explained by the motivation level of learners. Because the prep class is obligatory in ELT Department, the students were aware of their learning. This is also related with their ages as mentioned in studies of Dunn & Dunn (1992); (1993); Dunn, Dunn, & Perrin (1994), the energy level of time preferences stabilise with students' ages. As learners get older the more energetic, they become in the morning hours.

Table 5: ***Distribution of Students' Dominant Time Preferences***

Dominant Time Preference	Number	Percentage
Morning Hours	23	50
Afternoon & Evening Hours	11	23.9
Both	12	26
Total	46	99.9

4.2. Part 2: TEACHING STYLE OF THE INSTRUCTORS

RQ3. What are the teaching styles of the instructors in prep classes in the ELT Department?

In order to find out the teaching style of the instructors, The Teaching Style Questionnaire was administered to the six instructors of prep classes in the ELT Department. The first part of the questionnaire concerned statements about perceptual teaching styles. The second part included statements about time preferences of the instructors.

4.2.1. PERCEPTUAL PREFERENCES OF THE INSTRUCTORS

The first part of the Teaching Style Questionnaires aimed to measure perceptual teaching preferences – visual, auditory, tactile, and kinaesthetic. On each teaching style sub-scale, there were three statements. Instructors' responses to each teach style sub-scale provided their preferences for different perceptual teaching styles. Table 6 presents the descriptive statistics in each category of perceptual teaching style.

Table 6: ***Descriptive Statistics of the Use of Perceptual Teaching Styles***

	N	Minimum	Maximum	Mean	Std. Deviation
AUDITORY	6	6,00	15,00	10,8333	3,3116
VISUAL	6	7,00	13,00	10,8333	2,2286
KINAESTHETIC	6	8,00	12,00	10,5000	1,3784
TACTILE	6	6,00	10,00	8,0000	1,4142

As can be seen from the table 6, the instructors of prep classes preferred visual and auditory teaching styles equally [mean = 10.83], then the kinaesthetic teaching style preferred [mean = 10.50]. The least preferred perceptual teaching style was tactile [mean = 8.00].

Figure 5 illustrates the instructors' preference for different perceptual teaching styles. According to this, all of the instructors had a strong preference to convey a new teaching item both by lecturing or providing listening activities or organizing class discussions and visually, in a written language format. In a language classroom setting, instructors generally used the blackboard (or overhead projector) to list the essential points of a lecture, or provided students with an outline to follow during the lecture. Next, the kinaesthetic teaching style was preferred in which students can be active in the classroom by joining role-plays or games. The least preferred perceptual teaching style was the tactile teaching style.

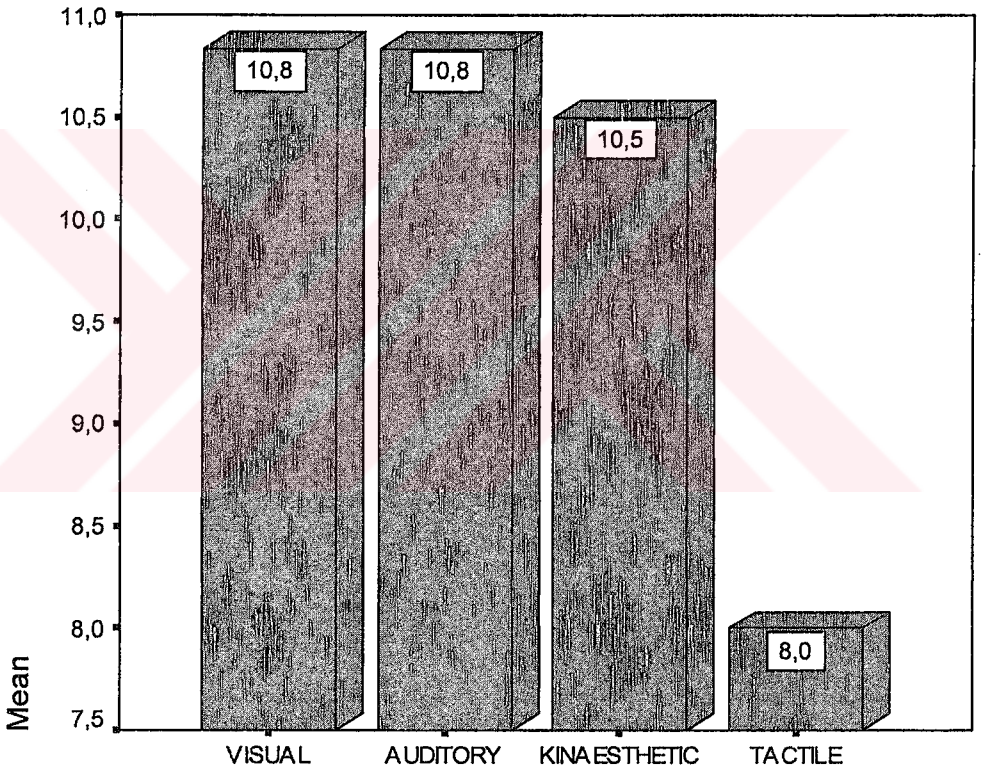

Figure 5: ***Means of the Use of Perceptual Teaching Styles***

4.2.2. INSTRUCTORS' PREFERENCE OF TIME

The second part of the Teaching Style Questionnaire concerned time preferences – morning hours, and afternoon & evening hours. There were three

statements on each sub-scale. Instructors' responses to statements on each time preference sub-scale determined their strong preference for time. The table 7 shows the mean scores of their time preferences.

Table 7: ***Descriptive statistics of Preference of Time***

	N	Minimum	Maximum	Mean	Std. Deviation
Morning Hours	6	6,00	12,00	10,0000	2,2804
Afternoon & Evening Hours	6	4,00	14,00	8,6667	4,2740

Table 7 presented that instructors felt better in the morning hours [mean =10.00]. The mean total of morning hours is explained by the fact that instructor tended to teach in the morning hours rather than in afternoon & evening hours [mean = 8.66]. The main reason for that might be the working hours, and this finding can again be supported by Dunn & Dunn, (1992); (1993); Dunn, Dunn, & Perrin, (1994) who say that people prefer to study or feel more motivated in the morning hours as they get older.

Figure 6 illustrates time preferences of instructors.

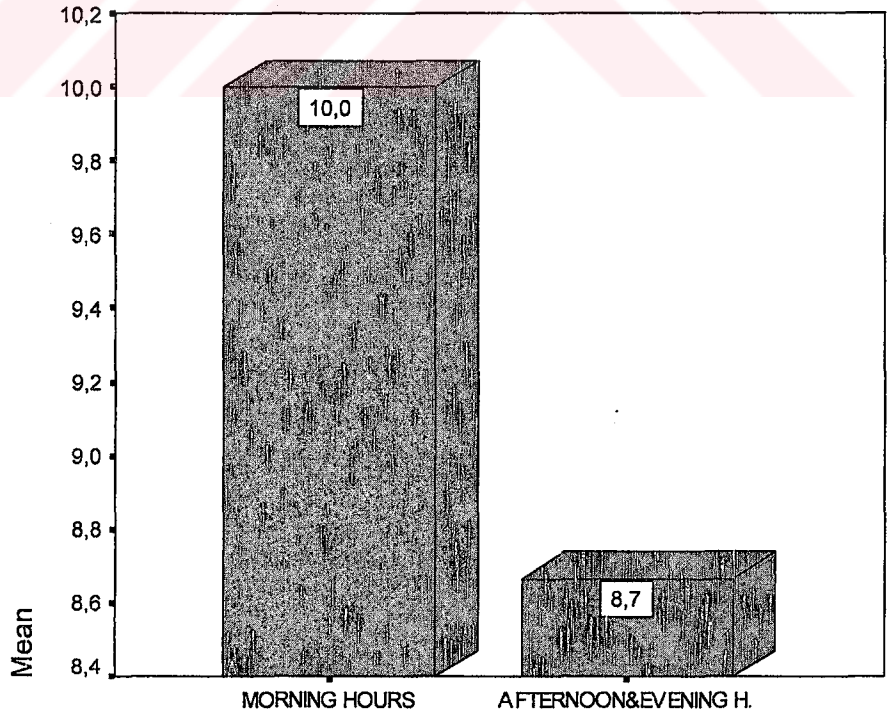

Figure 6: ***Means of the Time Preferences of Instructors***

4.3. Part 3: COMPARISON OF THE STUDENTS' AND INSTRUCTORS' PREFERENCES IN PART 1 AND 2

RQ4. Which student learning style is mostly supported by instructors' teaching style?

In order to answer this question, the perceptual teaching styles, and the preference of time of the instructors were compared together. Table 8 indicated the most preferred teaching styles of the instructors. As can be seen from the table, instructors claimed that they tended to use teaching methods and approaches mostly available for the students who had a visual and auditory learning style. Next, the kinaesthetic teaching style was used by the instructors; this meant that instructor liked to create teaching environments where students took part in activities, and can move around the classroom. The least preferred perceptual teaching style was tactile. The reason for that can be constraint of material use in language classrooms.

Table 8: *Descriptive Statistics of the Use of Teaching Styles*

	N	Minimum	Maximum	Mean	Std. Deviation
Auditory	6	6,00	15,00	10,8333	3,3116
Visual	6	7,00	13,00	10,8333	2,2286
Kinaesthetic	6	8,00	11,00	10,5000	1,1690
Morning Hours	6	6,00	12,00	10,0000	2,2804
Afternoon & Evening Hours.	6	4,00	14,00	8,6667	4,2740
Tactile	6	6,00	10,00	8,0000	1,4142

Figure 7 illustrates that the most popular learning style was visual and auditory in terms of perceptual learning styles. Here there was a mismatching between students' most preferred perceptual learning style and instructors' teaching style, because most of the students claimed that they did not use auditory learning styles as a dominant way of learning whereas the auditory teaching style was the instructors' most preferred way of teaching. This result confirms the finding of Cheng and Banya (1998) that there was a negative correlation between students' and instructors auditory preferences.

Finally, the morning hours preference was supported by the instructors which was an expected result due to scheduled working hours.

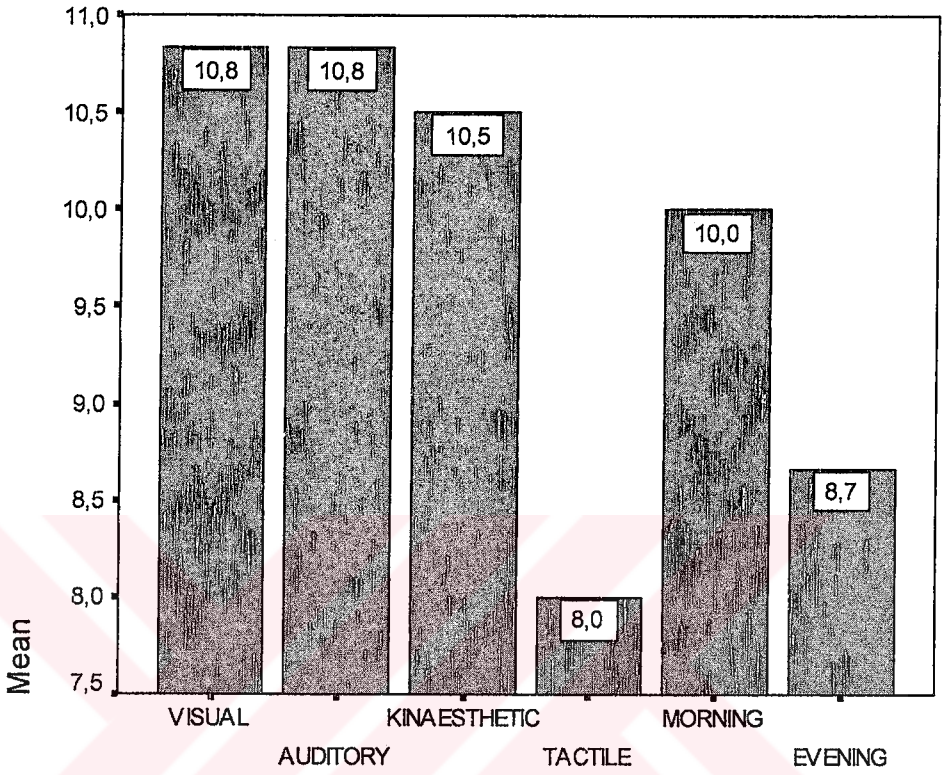

Figure 7: ***Illustration of the Use of Teaching Styles and Time Preferences***

RQ5. Is there a significant relationship between student study hours and their achievement, in terms of their preferences of time?

In order to answer this research question, firstly the students' time preference were computed and it was understood that 23 students had a strong preference to study in the morning hours while 10 of the students had a strong preference to study in afternoon & evening hours. As mentioned earlier, 24 of these students were day students and the other 22 were going to evening class. Thus, the proportion of strong preferences for both study periods had to be differentiated between the day students and evening students. Out of 23, who had a strong preference for morning hours, 15 students were day students. Out of 10, who preferred to study in afternoon & evening

hours, 7 students were evening students. Among the day students, 3 students claimed that they felt more motivated for learning in the afternoon and evening hours. Six of the day students had a preference to study for both morning hours and afternoon & evening hours. Among the evening students, eight of them desired to study most in morning hours and seven of them were more energetic and ready for learning in the afternoon & evening hours. The other seven preferred to study in both morning hours and afternoon & evening hours. This is shown in table 9 below.

Table 9: ***Distribution of Time Preferences and Their Means of Day and Evening Students***

TIME PREFERENCE		DAY STUDENTS		EVENING STUDENTS	
		Morning H.	A. & E. Hours	Morning H.	A. & E. Hours
Morning Hours	Number	15	15	8	8
	Mean	17,0000	10,0667	16,8750	10,8750
	Std. Deviation	1,2536	2,1865	1,3562	1,8851
	Number	3	3	7	7
A. & E. Hours	Mean	8,6667	17,0000	8,8571	16,2857
	Std. Deviation	2,3094	1,7321	1,2150	,4880
	Number	6	6	7	7
Both	Mean	13,0000	12,0000	12,4286	12,5714
	Std. Deviation	1,4142	,8944	1,6183	1,5119
	Number	24	24	22	22
Total	Mean	14,9583	11,4167	12,9091	13,1364
	Std. Deviation	3,2768	2,9476	3,6503	2,6956

A. & E.: Afternoon and Evening

Next, the data were analysed by Oneway ANOVA model in SPSS program. The day students' post-test scores were compared with their preferences of time. The mean of the students who had a strong morning hour's preference was 77.8667; of the students who had afternoon & evening hour's preference it was 75.6667; and of the students who had equal preference for both it was 78.6667. (See Table 10)

Table 10: ***One Way Anova Test: Comparison of Day-Students' Preference of Time and Post-Test Scores***

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Morning Hours	15	77,8667	4,2066	1,0861	66,00	84,00
A. & E. Hours	3	75,6667	3,2146	1,8559	72,00	78,00
Both	6	78,6667	5,0859	2,0763	73,00	86,00
Total	24	77,7917	4,2527	,8681	66,00	86,00

The same procedure was then applied to the evening students. The mean of the students who had an afternoon & evening hours preference was 77.8571, the students who had a morning hours preference was 78.2500; and the students who had preference for both of the periods was 75.0000. (See Table 11)

Table11: ***One Way Anova Test: Comparison of Evening Students' Preference of Time and Post-Test Scores***

	N	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Morning Hours	8	78,2500	3,0589	1,0815	72,00	81,00
A. & E. Hours	7	77,8571	4,2594	1,6099	71,00	83,00
Both	7	75,0000	3,8297	1,4475	70,00	80,00
Total	22	77,0909	3,8286	,8163	70,00	83,00

A. & E. Hours.: Afternoon & Evening Hours Preference
Both: Preference for Both

In order to examine in detail the relationship between students' time preferences and their final exam scores, multiple comparisons were used. Post Hoc Tests and Scheffe Test were employed because the group sizes were unequal. Appendix F and G present the multiple comparisons between the groups. However, a significant difference was not observed between these groups. This can be explained that the time of the study may have been marked by other orientations such as the need for success.

RQ6. Do the students achieve better understanding and success if there is a matching between their learning style and the instructors' teaching styles?

Our major concern in this study was to find out the similarities and dissimilarities between students' learning styles and instructors' teaching style and to investigate the effect of this relationship on students' academic achievement. In the previous sections, the perceptual learning styles, the preference of time of the students, and instructors' mostly preferred teaching styles were identified. In order to see the exact matching of teaching and learning styles, there was a need to classify instructors' teaching styles in terms of the subject matter they taught. To define the instructors' dominant/strongest teaching style, a scale, (defined in section 3.8) was used. Table 13 illustrates the teaching styles of the instructors.

RANGE	INDICATION
11------15	Strong
7------10	Medium
03------6	Weak

Table 12: ***Scores of the Instructors Teaching Styles***

Course name	Perceptual Teaching Style				Preference of time		Dominant/Strongest T.S.	
	V	A	T	K	M	A/E	P.T.S	P.o.T
Basic English	10	15	11	11	12	6	A/T/K	M
Reading (Day)	11	6	8	8	10	10	V	Medium preference for both
Reading (Evening)	7	14	6	12	9	14	A/K	A/E
Listening& Speaking (Day)	12	12	8	10	11	5	V/A	M
Listening& Speaking (Evening)	13	9	7	10	12	4	V	M
Writing	13	10	9	11	6	13	V/K	A/E
Means	10,8	10,8	8,1	10,5	10	8,67		

P.T.S. = Perceptual Teaching Styles
P.o.T. = Preference of Time
V = Visual
A = Auditory
T = Tactile
K = Kinaesthetic
M = Morning Hours
A/E = Afternoon & Evening Hours

As shown in Table 12, the instructors of the prep classes had different preferences. The Basic English instructor possessed a combination of auditory, tactile, and kinaesthetic perceptual teaching styles and had a tendency to convey the subject matter in the morning hours. The Reading instructor who taught day students had a strong visual preference, stating no strong preference of time and motivated for teaching in both the morning hours and afternoon & evening hours. The Reading instructor of the evening class had strong auditory and kinaesthetic perceptual preferences for teaching, with a preference of time matched with the class taught. The day students Listening & Speaking instructor claimed a combination of visual and auditory teaching style preferences whereas the evening students' Listening & Speaking instructor was a strong visual instructor. However, they had the same time factor preference; morning hours. In addition, the Writing instructor had a combination of visual and kinaesthetic perceptual teaching preference, with a preference for time supported which the students who felt themselves ready for learning in the afternoon and evening hours.

In matching the students' strongest learning styles (See Appendix D) and instructors teaching styles, a methodological problem arose due to the multiple preferences of the students. The number of subjects involved in this study did not allow the researcher to cluster students into groups in terms of their strongest preferences. As stated earlier, most of the students had a combination of strong preferences for learning and their scores for each subscale were very close to each other.

Gilanlioglu (1993) and Pouwels (1992) made a proposal to overcome this problem. That was to consider the highest score for a particular learning style as the subject's strongest preference for learning. However, as Erten (1998) stated, accepting this kind of categorization may cause further problems such as ignoring the group tendency and the subject's equal preferences for different subscales of the learning styles. Some examples are presented below in order to demonstrate this problem.

Student No	Visual	Auditory	Tactile	Kinaes-thetic	Dominant Learning Style
4	24,00	21,00	18,00	23,00	Dominant visual
16	19,00	22,00	23,00	24,00	Dominant kinaesthetic
21	15,00	17,00	18,00	21,00	Dominant kinaesthetic
29	24,00	20,00	24,00	24,00	Dominant kinaesthetic, tactile and visual
39	21,00	19,00	22,00	18,00	Dominant tactile

As the table above indicates, S4 might be accepted as a visual learner and S21 as a kinaesthetic learner. However, S4 had also a stronger preference for kinaesthetic learning than S21.

Moreover, S16 may be labelled a kinaesthetic learner and S39 as a tactile learner whereas S16 reported that his preference for tactile learning was stronger than S39.

As well as this, grouping students such as S29 would be impossible, due to the fact that S29 had equal preferences for kinaesthetic, tactile, and visual learning.

The presented examples show that classifying students according to their most preferred style may not provide valid solutions when the other students' preferences are compared to these students' preferences.

To overcome this problem, although the mean scores of the pre-test and post-test scores presented a significant improvement in each course (See tables 13 and 15); all the learning style preferences were examined on a continuous scale rather than grouping students with different learning style preferences. Application of this procedure allowed the researcher to compare all the students' learning styles and their pre-test and post-test scores.

In order to compare students' perceptual learning styles (visual, auditory, tactile, kinaesthetic), and preference of time (mourning hours - afternoon & evening hours) and their pre-test and post-test scores for each course; a bivariate Pearson Correlation Coefficient Test was employed on SPSS. Next, the correlation of each

course and learning style were compared according to the instructors' teaching style for that course.

Table 13: ***Means of Pre-Test and Post-Test Scores for each course of Day Students***

Course Name	Number	Pre-Test	Post-Test
Basic English	19	58,6316	73,7895
Reading	19	54,8947	77,1579
Listening	19	49,7368	78,8421
Speaking	19	48,6842	84,2105
Writing	19	43,3684	74,3158
Total Mean	19	51,2105	77,5263

Since five of the students did not participate in the pre-test, the data about them were not computed. The number of the day students therefore dropped from 24 to 19. The Basic English instructor had a tendency to use methods and approaches that supported auditory, tactile, and kinaesthetic learners. The correlation of these learners' preferences was examined and the statistical analysis revealed that only the preference for auditory learners correlated significantly with post-test score of Basic English course. ($p<.048$) (See Table 14)

For the Reading instructor of the day students, who had a strong preference for visual teaching, scores did not correlate to any of the students' preferences. (See Table 14)

For the Speaking & Listening course, which was given by a strong visual and auditory instructor, the post-test scores of the speaking exam correlate with the students auditory perceptual preferences ($p<.049$). Although the instructor had a visual preference, the post-test scores of the Listening and Speaking course did not correlate with students' visual preferences. (See Table 14)

Most preferred teaching styles of the Writing course instructor were visual and kinaesthetic. Nevertheless, the students' preferences for these styles did not correlate with post-test scores of the Writing course. (See Table 14)

Table 14: ***Relation Between Day Students' Perceptual Learning Styles and Their Scores In Pre-Test and Post-Test for each Course Item***

		Grammar 1	Grammar 2	Reading 1	Reading 2	Listening 1	Listening 2	Speaking1	Speaking2	Writing 1	Writing 2
Visual	Pearson correlation	,046	-,016	,013	,205	-,278	-,044	,186	-,060	-,217	,027
	Sig. (2-tailed)	,850	,949	,957	,399	,250	,858	,445	,808	,372	,912
Auditory	Pearson correlation	,252	**,459***	-,055	,157	-,230	-,126	,112	**,468***	,052	,103
	Sig. (2-tailed)	,298	**,048**	,823	,522	,343	,606	,647	**,049**	,832	,674
Tactile	Pearson correlation	-,030	-,041	-,216	-,055	-,115	-,112	-,139	-,194	,515	-,005
	Sig. (2-tailed)	,902	,866	,374	,822	,639	,648	,569	,427	,024	,985
Kinaesthetic	Pearson correlation	,188	,266	,344	-,233	-,103	,158	-,121	,061	-,137	,381
	Sig. (2-tailed)	,441	,270	,150	,337	,675	,518	,620	,805	,575	,107
	N	19	19	19	19	19	19	19	19	19	19

* Correlation is significant at the 0.05 level (2-tailed).

Table 15: ***Means of Learning Styles and Pre-Test and Post-Test Scores for Evening Students***

Course Name	Number	Pre-Test	Post-Test
Basic English	20	57,9000	73,3500
Reading	20	65,5500	80,3000
Listening	20	45,5500	79,6000
Speaking	20	53,1000	83,5500
Writing	20	41,9000	69,0000
Total Mean	20	52,7500	77,1500

As it was stated earlier, there were 22 students in the evening class but two of them did not attend the Pre-Test so their data were removed from this part of the study. Although the Basic English instructor had strong preferences for auditory, tactile, and kinaesthetic teaching style, the teaching style only benefited the kinaesthetic learners ($p<.032$). (See Table 16)

The Reading course instructor of the evening students was a visual and kinaesthetic teacher. However, this instructor's style did not have any affect on the students. (See Table 16)

The instructor of the Listening & Speaking course had a visual preference for teaching. Nevertheless, there was neither a positive nor a negative correlation between this instructor's teaching style and students preferred perceptual learning styles and their exam scores. (See Table 16)

The teaching style of the Writing course instructor did not correlate with any of the students' perceptual learning styles when the learning styles were compared to writing1 and writing2 exam scores. (See Table 16)

The Pearson correlation analysis indicated that the matching of only a few learning styles and teaching styles had a significant relationship with the final exam scores of the students. (See Table 16)

Table 16: ***Relation between Evening Students' Perceptual Learning Styles and their Scores in Pre-Test and Post-Test for each Course Item***

		Grammar 1	Grammar 2	Reading 1	Reading 2	Listening 1	Listening 2	Speaking 1	Speaking 2	Writing 1	Writing 2
Visual	Pearson correlation	,150	,326	-,223	,387	,379	,142	-,111	-,161	,363	-,054
	Sig. (2-tailed)	,529	,160	,346	,092	,100	,549	,640	,497	,115	,821
Auditory	Pearson correlation	-,134	-,007	,071	-,098	-,069	-,275	,338	-,038	-,053	,129
	Sig. (2-tailed)	,573	,977	,765	,683	,771	,241	,145	,872	,825	,587
Tactile	Pearson correlation	,023	-,116	-,110	-,130	,053	-,209	,159	-,394	,322	-,155
	Sig. (2-tailed)	,923	,627	,645	,584	,825	,376	,503	,086	,166	,514
Kinaesthetic	Pearson correlation	-,198	**-,481***	,145	-,284	-,094	-,097	,139	,031	,080	-,060
	Sig. (2-tailed)	,402	**,032**	,542	,225	,693	,684	,560	,898	,738	,801
	N	20	20	20	20	20	20	20	20	20	20

* Correlation is significant at the 0.05 level (2-tailed).

4.4. DISCUSSIONS

4.4.1. LEARNING STYLES OF THE STUDENTS

One of the aims of this study was to determine the students' perceptual learning styles and preference of time. As described in the results section, students generally preferred the kinaesthetic perceptual channel in reaching a new learning item (m = 21.02); and followed by the visual perceptual channel with a mean of 20.91. The auditory perceptual channel was the least preferred one. Most prior research findings were similar to the current study's results (e.g. Dunn 1984, Reid 1987, Stebbins 1995, Cheng and Banya 1998). As Reid (1987) indicated in his study, perceptual learning styles differ depending on cultural factors and educational backgrounds. In EFL classrooms in Turkey, English teachers use methodologies and approaches, which provide opportunities for students to move in the classroom or to experience the learned item visually.

The findings revealed that students felt more energetic in the morning hours than afternoon & evening hours with a mean of 13.97. One of the reasons could be the previous educational experience of the students. According to their background stated in the Learning Style Questionnaire, all students graduated from day high schools.

4.4.2. TEACHING STYLES OF THE INSTRUCTORS

Instructors involved in this study, as stated in the findings, were predominantly auditory and visual teachers with an equal mean of 10.83. It was understood that the instructors have a tendency to assume that everybody can learn best in the way they themselves have learned or are learning, as Friedman and Oxford (1984) stated in his study. Moreover, a negative relation was found between instructors' auditory teaching preferences and students' auditory learning preferences.

4.4.3. MATCHING OF LEARNING STYLES AND TEACHING STYLES

Considering previous studies carried out on this subject that matched learning/teaching styles increase students' attitudes, performance, and academic achievement; the findings of this study did not confirm the previous findings. Although some significant relations were found between auditory learning and auditory teaching and kinaesthetic learning and kinaesthetic teaching, and these matched pairs improved their scores in the courses whose instructors preferred to teach predominantly with these styles, there was not a significant relation between other matched pairs and their post-test scores. This reminds us of the complexity of the learning style concept and as Tyacke (1998) stated, learning styles are complex in nature and it is difficult to define someone as predominantly visual or auditory because learners may tend to use both of the styles interchangeably in different learning situations.

Matching instruction to every learner's needs is very difficult in terms of available teachers and rooms, distribution of students, administrative considerations, and so on. Rather, a teacher should try to provide a variety of learning experiences to accommodate the various learning styles that exist in the average classroom. Then all students will have at least some activities that appeal to them based on their learning styles, and they are more likely to be successful in these activities. The feeling of success will be a motivating factor for additional learning.

4.5. CHAPTER SUMMARY

This chapter presented the main findings and statistical analysis of the study. The findings of the study were discussed in the lights of the current literature.

CHAPTER V
CONCLUDING REMARKS

5.0. INTRODUCTION

In this chapter, firstly a brief summary of the study will be given. Then, implications of this study for learners and teachers will be presented and some useful suggestions will be made. Finally, limitations and suggestions for further research will be discussed.

5.1 SUMMARY OF THE STUDY

One of the reasons why teaching is so difficult is that we do not know enough about all the factors affecting learning. For instance, we know that learners are very different from one another, but we cannot agree on how they differ or on what these differences mean for education.

In recent decades, researchers and instructors, shifting their attention from teaching methodology to the individual differences of learners, have begun to study and experiment in the field of learning styles. The aim of these studies and experiments with learning styles is, of course, to understand the individual differences better and to deal with these differences in the classroom.

Supporters of the learning style movement like Carbo (1983), Dunn (1984, 1990), Reid (1987) Price (1990) and many others argue that teaching through learners' strongest learning style preferences, regardless of the content, increases academic achievement and improves attitudes toward the course being taught. Nevertheless, the learning style paradigm is a complex area; most of the researchers have focused on different aspects of learning styles. For example, Reid (1987) says

that almost 90% of conventional classroom instructions are geared towards auditory learners, and only 20% to 30% of any large group could remember 75% of what was presented orally. To solve this problem, some learning style theorists suggest matching instructors' and students styles, thinking that in this way the students will be exposed to teaching styles that are consistent with their learning styles.

Experimental studies done by Dunn, Griggs, Olson, & Beasly (1995), based on the Dunn, Dunn, and Price Learning Style Model, and conducted between 1980 and 1990 investigated to determine the value of teaching students through their learning-style preferences. Thirty-six studies provided a database of 3,181 participants. Results were synthesized through meta-analysis and the standard normal curve suggests that students whose learning styles are accommodated would be expected to achieve 75% of a standard deviation higher than students whose learning styles have not had accommodated. This finding indicates that matching students' learning-style preferences with educational interventions compatible with those preferences is beneficial to their academic achievement.

In this study, in order to achieve similar results to recent studies, the subjects' perceptual learning styles and their preference of time were identified by means of questionnaires prepared for the design of this study in order to find answers to the following research questions.

RQ1. What are perceptual modality preferences of the participants – auditory, visual, kinaesthetic, or tactile?

RQ2. What are the physical needs of the participants in terms of time – morning, afternoon and evening?

RQ3. What are the teaching styles of the instructors in prep classes in the ELT Department?

RQ4. Which student learning style is mostly supported by instructors' teaching style?

RQ5. Is there a significant relationship between student study hours and their achievement, in terms of their preferences of time?

RQ6. Do the students achieve better understanding and success if there is a matching between their learning style and the instructors' teaching styles?

The findings will be organised under four headings:

1. The results of the students' learning style distribution,
2. The results of the instructors' teaching style distribution,
3. The results with regard to the relationship between students' preference of time and their performance,
4. The results with regard to the relationship between students' learning styles and instructors' teaching styles,

5.1.1. RESULTS OF THE STUDENTS' LEARNING STYLE DISTRIBUTION

Firstly, the perceptual learning style preference of the students was identified and it was seen that the most preferred perceptual learning style among students was kinaesthetic learning, followed by visual learning, then tactile learning, and auditory learning was the least preferred one. Moreover, this result was similar to previous studies results (Reid, 1987, O'Brien 1990, Kinsella 1995, Erten 1998). Rossi-Le (1995) discovered that older and more proficient language learners preferred learning visually because the more students are exposed to the written word, the more comfortable they feel learning visually (cited in Oxford and Anderson 1995).

Second, the students' preference of time was investigated in terms of their study hours and the findings revealed that students tended to study in the morning hours more than in the afternoon & evening hours.

5.1.2 RESULTS OF THE INSTRUCTORS' TEACHING STYLE DISTRIBUTION

In identifying instructors' teaching styles, first their perceptual teaching styles were analysed. The findings revealed that the most preferred styles were auditory teaching and visual teaching since their means were equal. Then followed kinaesthetic teaching and the least preferred teaching style was tactile teaching.

The time preference of the instructors' was for morning hours over afternoon & evening hours.

5.1.3. RESULTS WITH REGARD TO THE RELATIONSHIP BETWEEN STUDENTS' PREFERENCE OF TIME AND THEIR PERFORMANCE

There were two groups of student-subjects involved in this study .24 of them were day students and the other 22 were evening students. The effect of time preferences on students' academic success was investigated. For the day class, One Way ANOVA test results revealed that the students' mean scores for the morning hours were higher than the students who preferred afternoon and evening hours. In addition, the students who had a strong preference for both of the time periods got higher scores then the first two groups.

However, for the evening group, One Way ANOVA test showed that the students who preferred afternoon and evening hours got lower scores than the students who preferred morning hours. This can be explained by the previous educational life of the students who used to go to school in the morning hours. Further Post Hoc Tests and Scheffe test were the employed in order to discover any significant statistical relationship. However, these tests revealed that there was not a significant relationship between the time factor and students' academic achievement.

5.1.4. RESULTS WITH REGARD TO THE RELATIONSHIP BETWEEN STUDENTS' LEARNING STYLES AND INSTRUCTORS' TEACHING STYLES

This study also aimed to identify the students' learning style predominantly supported by the instructors. The mean scores of all the teaching styles indicated that the visual and auditory learners were mainly supported by instructors; that the students preferred to learn mostly via visual means and activities that required involvement. There was a matching in terms of visual learners. To the contrary, the students' least preferred way of learning was auditory while this was the instructors' most preferred way of teaching.

The main goal of this study, however, was to investigate the similarity and dissimilarity of learning and teaching styles on students' academic success. Although the mean difference of the students' pre-tests and post-tests showed that, there was a significant improvement on each course, in order to test the effect of matched learning and teaching styles, a Pearson correlation coefficient test was employed between preferences of all students for each sub-scale of the learning style questionnaire and their pre-test and post-test scores.

The results of correlation statistics for day students revealed that there was a significant relation between auditory learners, Basic English course, and the Listening & Speaking course, whose instructors used predominantly auditory teaching styles. For the other courses, statistics results indicated that there was not a significant relation between students' perceptual preferences and post-test scores even though the students' learning styles were matched with the teaching style of the instructor of that course.

For the evening group, the statistical correlations denoted that there was a weak correlation between kinaesthetic learners and their final scores on the Basic English course, the instructor of which preferred to use a kinaesthetic teaching style.

For the other courses, there was not a significant relation between students' perceptual preference and their post-test scores on any course, even with the matched pairs.

The finding of the study failed to confirm the claims of the learning style theorists that matching teaching and learning styles significantly increases academic achievement albeit there were some significant relations.

Therefore, the results remind us again of the complexity of variables, which affect learning in general, and foreign language learning in particular. Thus, rather than focusing on only one dimension of learning, one must consider a multiplicity of interacting factors such as the compensating role of motivation, the nature of the learning task, the relationship between the instructor and learner, and other situational variables (Doyle & Rutherford 1984).

In addition to the problem of complexity of identifying learning styles, Corbet and Smith (1984) discuss the problem of reliability of such learning style instruments, after attempting to validate the Edmonds Learning Style Identification Exercises (ELSIE). Gregorc (1979) (cited in Reid 1987), lists three shortcomings of self-assessment instruments:

a) The instruments are exclusive (i.e., they focus on certain variables),
b) the students may not self-report accurately,
c) The students have adapted for so long that they may report on adapted preferences.

Aside from this, the possibility exists that the instruments may be flawed and the identification of style preferences might be inadequate in this study. Due to time limitations, the researcher was not able to make classroom observations in order to verify whether the teachers' and learners' preferences indicated in the questionnaires related to their actual strengths, and therefore had to base the study only on the self-report data of the questionnaires. Another difficulty in the research was finding

appropriate classes that had been taught by the same teacher for a certain amount of time (at least one term). This limited the study to a small numbers of subjects. All these factors may have affected the results and the generalizibility of the study.

5.2. IMPLICATIONS

In spite of the fact that the findings revealed that there was not much relation between teaching and learning style similarities or dissimilarities and language learning, the learning style approach may still be promising for teachers and students in general and language education in particular. Students may benefit particularly from a discussion of learning styles, self-assessment instruments, and experience with alternative styles that will help them function better in classrooms. During freshmen orientation programs, students should be assessed for their preferred learning style and offered counselling on how to adapt their learning style to various teaching styles they are destined to encounter in university classrooms. As a result, students will gain confidence in their learning strengths and develop various learning strategies for handling challenging situations that are certain to arise. Students will also begin to see how they learn most effectively and efficiently, allowing them to be better able to take more responsibility for their own learning.

In addition, the understanding and use of different teaching styles by the instructor, as well as the awareness of individual learning styles by the student, may determine the effectiveness of teaching and learning interaction in the classroom. The EFL teachers' awareness of individual differences may enhance their understanding of learning, and provide them with alternative approaches to teaching. Smith & Renzulli (1984:49) echo this theme when they say: "A teacher who can purposefully exhibit a wide range of teaching styles is potentially able to accomplish more than a teacher whose repertoires are relatively limited".

5.3. LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

Since the data were collected by means of questionnaires and were the only source of information, it is suggested that researchers verify the results of self-report instruments with classroom observations or test to determine whether the subjects behave in actual situations as they indicate in the questionnaire.

Although this study comprised two different factors influencing learning, new dimensions to learning may be added. In addition, the relationship between teaching and learning styles also needs to be studied from different points of view. For example, do students who have low accommodative ability suffer more from mismatch than students who can accommodate to the teacher's style?, or is there a correlation between strongest style preferences and adaptability?

Researchers in the field of learning styles should proceed toward integrating the complex construct of learning. Foreign/Second language researchers should focus on the long-term goal of creating an integrated student profile that includes social, psychological, perceptual, and environmental dimensions. They should then provide new and reliable assessment procedures that will increase learner's independence in language learning.

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APPENDICES

Appendix A:

Perceptual Learning Style Preference Inventory (PLSPI)

Appendix B:

Learning Style Questionnaire (LSQ)

Appendix C:

Teaching Style Questionnaire (TSQ)

Appendix D:

The Students' Preferences for Different Perceptual Learning Styles

Appendix E

The Students' Preferences for Physical Need of Time

Appendix F

Multiple Comparisons of the Day Students Preference of Time and their Post-Test Scores

Appendix G

Multiple Comparisons of the Evening Students Preference of Time and their Post-Test Scores

APPENDIX A

PERCEPTUAL LEARNING STYLE PREFERENCE INVENTORY

Name: ..... Age: ..... Sex: Female / Male

Nationality: .....

How long have you been studying English? .....

How long have you been in England? .....

Your English proficiency is : Intermediate Upper-Intermediate Advanced

INSTRUCTIONS: This questionnaire has been designed to help you find out the way(s) you feel you learn languages. Different people learn in different ways: some people prefer to learn with their eyes (seeing, reading, etc.), while some prefer to learn with their ears (hearing and listening). Some people learn best by doing and /or touching things.

Read the statements below carefully and circle one of the given options that you feel best represents your feelings about the statements. You have six (from 1 to 6) options to choose from. The numbers indicate your agreement level with the statements. **1** indicates **strong disagreement** and **6** indicates **strong agreement**. Please examine carefully the following scale.

1. ..... Strongly disagree (SD)
2. ..... Disagree
3. ..... Slightly disagree

---

4. ..... Slightly agree
5. ..... Agree
6. ..... Strongly agree (SA)

For example if you **STRONGLY DISAGREE**, mark:

1 2 3 4 5 6

or if you **SLIGHTLY AGREE,** then mark:

1 2 3 **4** 5 6

IMPORTANT: There are no right or wrong answers to the statements. Therefore, do not answer as you think you should, just answer according to exactly how you feel. Please try to answer quickly without spending too much time on statements and try not to change your answers.

Now read the following sentences and choose from 1 to 6 according to how you agree with each sentence	**SD ←----→SA**
1. I learn well when I see written explanations.	1 2 3 4 5 6
2. I do not forget things I have heard.	1 2 3 4 5 6
3. When I see a plan of the subject I study, it helps me to understand better.	1 2 3 4 5 6
4. I find it difficult to concentrate on the lesson when I stay seated for some time. (b)	1 2 3 4 5 6
5. When someone explains to me how to do things, I learn better.	1 2 3 4 5 6
6. I do well on tests if they are about things I have actively participated in	1 2 3 4 5 6
7. I learn well when I see pictures related to the subject I study.	1 2 3 4 5 6
8. I learn well when I listen to someone explain the subject. (a)	1 2 3 4 5 6
9. I like to make things with my hands.	1 2 3 4 5 6
10. I learn well when I am involved in lots of movement in language classes.	1 2 3 4 5 6
11. It helps me to learn well when the teacher lets us examine real objects in the classroom.	1 2 3 4 5 6
12. When I can practise my English using t in physical activities, I learn well.	1 2 3 4 5 6
13. I do not forget things I have seen.	1 2 3 4 5 6
14. I understand better when I study aloud. (b)	1 2 3 4 5 6
15. I learn well when I make something for a class project. (a)	1 2 3 4 5 6
16. When I make drawings as I study, I learn better. (a)	1 2 3 4 5 6
17. I do not forget things I have learned in physical language games.	1 2 3 4 5 6
18. If tests are about things I have heard, I do well. (c)	1 2 3 4 5 6
19. I can easily picture things in my head. (b)	1 2 3 4 5 6
20. I feel I learn well when I do projects like designing posters.	1 2 3 4 5 6

a) Based on Reid (1987) **b)** Based on O'Brien (1990) **c)** Based on Townsend and Townsend (1992)

Scoring The PLSPI

Transfer your scores for each sentence onto each line and add up the scores in each column:

VISUAL	AUDITORY	TACTILE	KINAESTHETIC
1- ……..	2- …….	9- …….	4- …….
3- ……..	5- …….	11- ……	6- …….
7- ……..	8- …….	15- ……	10- ……
13- ……	14- ……	16- ……	12- ……
19- ……	18- …….	20- …….	17- ……
TOTAL:	TOTAL:	TOTAL:	TOTAL:

APPENDIX B

LEARNING STYLE QUESTIONNAIRE

Name: ..... Date: .....

Age: ..... Sex: Male ☐ / Female ☐

Which school did you graduate from?

Anatolian Teacher Training High School ☐ Anatolian High School ☐

State High School ☐ Private High School ☐

Other: .....

Did you have a prep course in high school? Yes ☐ No ☐

The year of your graduation: .....

What was your English language score in the University Entrance Exam? .....

Ç.O.M.U. ELT Department was my ..... choice.

The statements on the following page will help you recognize your personal Learning Style. By answering as accurately as you can, you will get the most useful results, and you will understand how you learn best.

The way you learn and think, process information, solve problems and concentrate is your key to success in your studies and in life.

Please follow these instructions carefully:

Respond to all statements according to your preferences when you are concentrating, solving a problem, learning something new and/or difficult, or working on an assignment that is difficult for you.

Decide whether you agree or disagree with each statement. Please respond to the statements **quickly** without too much thought. Choose the most appropriate choice for you.

5-Strongly Agree 4-Agree 3-Undecided 2-Disagree 1- Strongly Disagree

REMEMBER: This is not a test; there are no trick questions, no 'right', or 'wrong answers'.

	APPENDIX B (CONTINUED)					
	STATEMENTS:	**SA**	**A**	**U**	**D**	**SD**
1	I learn well when I see written explanations.	5	4	3	2	1
2	I do **NOT** forget things I have heard.	5	4	3	2	1
3	My concentration is better during the morning hours.	5	4	3	2	1
4	When I see a plan of the subject I study, it helps me to understand better.	5	4	3	2	1
5	I find it difficult to concentrate on the lesson when I stay seated for some time.	5	4	3	2	1
6	I feel myself fully motivated between 10 a.m. and 12.00 a.m. for studying.	5	4	3	2	1
7	When someone explains to me how to do things, I learn better.	5	4	3	2	1
8	I do well on tests if they are about things I have actively participated in.	5	4	3	2	1
9	I would rather work on difficult learning tasks or assignments in the evenings.	5	4	3	2	1
10	I learn well when I see pictures related to the subject I study.	5	4	3	2	1
11	I learn well when I listen to someone explain the subject.	5	4	3	2	1
12	I like to make things with my hands.(models, arts and crafts)	5	4	3	2	1
13	I prefer to complete difficult learning tasks during the afternoon hours.	5	4	3	2	1
14	I learn well when I am involved in lots of movement in language classes.	5	4	3	2	1
15	It helps me to learn well when the teacher lets us examine real objects in the classroom.	5	4	3	2	1
16	When I can practise my English using it in physical activities, I learn well.	5	4	3	2	1
17	I prefer to study when the sun sets.	5	4	3	2	1
18	I do **NOT** forget things I have seen.	5	4	3	2	1
19	I understand better when I study aloud.	5	4	3	2	1
20	I would rather work on more complicated assignments in the afternoon only.	5	4	3	2	1
21	I learn well when I make something for a class project.	5	4	3	2	1
22	When I make drawings as I study, I learn better.	5	4	3	2	1
23	I do **NOT** forget things I have learned in physical language games.	5	4	3	2	1
24	I would like to study or work on difficult assignments mainly in the morning hours.	5	4	3	2	1
25	If tests are about things I have heard, I do well.	5	4	3	2	1
26	I can easily picture things in my head.	5	4	3	2	1
27	I feel I learn well when I do projects like designing posters.	5	4	3	2	1
28	I would rather study early or attend early morning lectures, and finish in the early afternoon.	5	4	3	2	1

Thank You Very Much for Your Cooperation and Time

Sedat BECEREN

APPENDIX C

TEACHING STYLE QUESTIONNAIRE

Name: ..... Date: .....

Male / Female (Circle)

Teaching experience (years): .....

Directions

Students learn in many different ways, for example some people learn primarily with their eyes or ears; some prefer to learn by experience or hands-on tasks. Some people are good at expressing themselves orally while some are good at expressing themselves in written form. Some tend to study early in the morning; some prefer to study difficult subjects in the evening.

Likewise, teachers teach in many different ways. This questionnaire has been designed to help you identify the ways you prefer to teach.

Answer the following questions according to the FREQUENCY of their occurrence in your teaching. (Circle one number only for each answer)

Please rate yourself: 5 - Almost always
4 – Frequently
3 - Sometimes
2 – Occasionally
1 - Hardly ever

Please respond to each statement quickly, without too much thought. Try not to change your responses after you choose them. Please circle your answers.

No	Statements	5	4	3	2	1
1	I feel more motivated in morning classes than in evening classes.	5	4	3	2	1
2	Do you provide possibilities for your students to picture what they have heard, seen, or read?	5	4	3	2	1
3	Are your students assigned to do computer-based homework?	5	4	3	2	1
4	Do you expect your students to sit properly and work at their desks?	5	4	3	2	1
5	If it was up to me, I would like lecture only evening classes.	5	4	3	2	1
6	When you teach something new and difficult, do you lecture to the whole class, standing in front of the black / white board?	5	4	3	2	1
7	I feel biologically all right in morning classes.	5	4	3	2	1

8	Do you use a lot of visuals (like pictures, OH transparencies, mind maps, graphics, wall charts, and videos) in your teaching?	5	4	3	2	1
9	Do you encourage your students to be active in role-plays?	5	4	3	2	1
10	I am comfortable in late afternoon classes.	5	4	3	2	1
11	Is there continual silent "reading" (up to 5 minutes) going on in your classes?	5	4	3	2	1
12	Are your students allowed to play with something while listening or speaking during your classes?	5	4	3	2	1
13	If it was my choice, I would like to teach only morning classes.	5	4	3	2	1
14	Does your teaching include demonstrations?	5	4	3	2	1
15	Do you allow your students to stand up, stretch or move around while they are learning something difficult?	5	4	3	2	1
16	My motivation is higher in evening classes than in morning classes.	5	4	3	2	1
17	Do you provide listening activities about the subject you teach?	5	4	3	2	1
18	Can your students physically experience what they are learning in your class? (making models)	5	4	3	2	1

Thank You Very Much for Your Cooperation and Time

Sedat BECEREN

APPENDIX D
STUDENTS' PREFERENCES FOR DIFFERENT PERCEPTUAL LEARNING STYLES

Student No	Visual	Auditory	Tactile	Kinaes-thetic	Dominant Learning Style
1	22,00	23,00	15,00	16,00	Dominant auditory and visual
2	17,00	14,00	17,00	21,00	Dominant kinaesthetic
3	19,00	23,00	17,00	19,00	Dominant auditory
4	24,00	21,00	18,00	23,00	Dominant kinaesthetic, visual and auditory
5	20,00	17,00	22,00	21,00	Dominant tactile and kinaesthetic
6	21,00	17,00	22,00	21,00	Dominant tactile and kinaesthetic and visual
7	24,00	18,00	21,00	20,00	Dominant visual and tactile
8	21,00	18,00	18,00	18,00	Dominant visual
9	22,00	16,00	19,00	19,00	Dominant visual
10	19,00	20,00	21,00	23,00	Dominant kinaesthetic and tactile
11	19,00	19,00	23,00	22,00	Dominant tactile and kinaesthetic
12	22,00	13,00	13,00	19,00	Dominant visual
13	20,00	17,00	15,00	21,00	Dominant kinaesthetic
14	20,00	20,00	18,00	23,00	Dominant kinaesthetic
15	22,00	20,00	20,00	22,00	Dominant kinaesthetic and visual
16	19,00	22,00	23,00	24,00	Dominant kinaesthetic, tactile and auditory
17	19,00	16,00	21,00	22,00	Dominant kinaesthetic, tactile
18	23,00	20,00	19,00	21,00	Dominant visual and kinaesthetic
19	23,00	21,00	21,00	22,00	Strong parity
20	21,00	18,00	18,00	22,00	Dominant kinaesthetic and visual
21	15,00	17,00	18,00	21,00	Dominant kinaesthetic
22	23,00	15,00	23,00	19,00	Dominant visual and tactile
23	21,00	18,00	22,00	23,00	Dominant kinaesthetic, tactile and visual
24	21,00	18,00	21,00	21,00	Dominant kinaesthetic, tactile and visual
25	21,00	17,00	22,00	23,00	Dominant kinaesthetic, tactile and visual
26	22,00	20,00	17,00	23,00	Dominant kinaesthetic and visual
27	22,00	19,00	18,00	21,00	Dominant visual and kinaesthetic
28	24,00	20,00	21,00	22,00	Dominant visual, kinaesthetic and tactile
29	24,00	20,00	24,00	24,00	Dominant kinaesthetic, tactile and visual
30	25,00	18,00	22,00	18,00	Dominant visual and tactile
31	23,00	18,00	18,00	17,00	Dominant visual
32	21,00	11,00	12,00	18,00	Dominant visual
33	24,00	19,00	18,00	25,00	Dominant kinaesthetic and visual
34	21,00	20,00	15,00	17,00	Dominant visual
35	18,00	18,00	20,00	22,00	Dominant kinaesthetic
36	21,00	16,00	14,00	21,00	Dominant visual and kinaesthetic
37	16,00	17,00	12,00	21,00	Dominant kinaesthetic
38	19,00	19,00	21,00	21,00	Dominant kinaesthetic, tactile
39	21,00	19,00	22,00	18,00	Dominant tactile and visual
40	14,00	21,00	17,00	18,00	Dominant auditory
41	20,00	19,00	21,00	23,00	Dominant tactile and kinaesthetic
42	20,00	24,00	19,00	23,00	Dominant kinaesthetic and auditory
43	24,00	24,00	22,00	22,00	Strong parity
44	19,00	14,00	19,00	21,00	Dominant kinaesthetic
45	23,00	17,00	21,00	24,00	Dominant kinaesthetic, visual and tactile
46	23,00	19,00	23,00	22,00	Dominant visual, tactile and kinaesthetic
Mean	20,91	18,48	19,2	21,02	

APPENDIX E
STUDENTS' PREFERENCES FOR PHYSICAL NEED OF TIME

Student No	Morning Hours	Afternoon & Evening Hours	Physical Need of Time
1	16,00	11,00	Strong Morning Hours Preference
2	16,00	12,00	Strong Morning Hours Preference
3	18,00	8,00	Strong Morning Hours Preference
4	13,00	12,00	Medium Preference for Both
5	20,00	9,00	Strong Morning Hours Preference
6	12,00	11,00	Medium Preference for Both
7	17,00	10,00	Strong Morning Hours Preference
8	17,00	11,00	Strong Morning Hours Preference
9	16,00	10,00	Strong Morning Hours Preference
10	17,00	11,00	Strong Morning Hours Preference
11	15,00	13,00	Medium Preference for Both
12	11,00	11,00	Medium Preference for Both
13	13,00	13,00	Medium Preference for Both
14	18,00	11,00	Strong Morning Hours Preference
15	14,00	12,00	Medium Preference for Both
16	16,00	9,00	Strong Morning Hours Preference
17	16,00	6,00	Strong Morning Hours Preference
18	10,00	16,00	Strong Afternoon & Evening Hours Preference
19	16,00	12,00	Strong Morning Hours Preference
20	17,00	8,00	Strong Morning Hours Preference
21	19,00	8,00	Strong Morning Hours Preference
22	6,00	19,00	Strong Afternoon & Evening Hours Preference
23	16,00	15,00	Strong Morning Hours Preference
24	10,00	16,00	Strong Afternoon & Evening Hours Preference
25	17,00	14,00	Strong Morning Hours Preference
26	17,00	12,00	Strong Morning Hours Preference
27	11,00	11,00	Medium Preference for Both
28	15,00	14,00	Medium Preference for Both
29	20,00	10,00	Strong Morning Hours Preference
30	9,00	16,00	Strong Afternoon & Evening Hours Preference
31	9,00	16,00	Strong Afternoon & Evening Hours Preference
32	11,00	17,00	Strong Afternoon & Evening Hours Preference
33	13,00	14,00	Medium Preference for Both
34	16,00	12,00	Strong Morning Hours Preference
35	12,00	11,00	Medium Preference for Both
36	16,00	8,00	Strong Morning Hours Preference
37	11,00	11,00	Medium Preference for Both
38	17,00	11,00	Strong Morning Hours Preference
39	11,00	17,00	Strong Afternoon & Evening Hours Preference
40	16,00	11,00	Strong Morning Hours Preference
41	8,00	16,00	Strong Afternoon & Evening Hours Preference
42	16,00	9,00	Strong Morning Hours Preference
43	9,00	16,00	Strong Afternoon & Evening Hours Preference
44	9,00	16,00	Strong Afternoon & Evening Hours Preference
45	14,00	13,00	Medium Preference for Both
46	7,00	17,00	Strong Afternoon & Evening Hours Preference
Mean	13,98	12,3	

APPENDIX F

MULTIPLE COMPARISONS OF THE DAY STUDENTS PREFERENCE OF TIME AND THEIR FINAL EXAM SCORES

Dependent Variable: FINAL

			Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
	(I) TIME	(J) TIME				Lower Bound	Upper Bound
Scheffe	,00	1,00	2,2000	2,7524	,730	-5,0476	9,4476
		2,00	-,8000	2,1022	,930	-6,3355	4,7355
	1,00	,00	-2,2000	2,7524	,730	-9,4476	5,0476
		2,00	-3,0000	3,0773	,628	-11,1031	5,1031
	2,00	,00	,8000	2,1022	,930	-4,7355	6,3355
		1,00	3,0000	3,0773	,628	-5,1031	11,1031
Dunnett C	,00	1,00	2,2000	2,7524		-8,6716	13,0716
		2,00	-,8000	2,1022		-8,1042	6,5042
	1,00	,00	-2,2000	2,7524		-13,0716	8,6716
		2,00	-3,0000	3,0773		-15,3232	9,3232
	2,00	,00	,8000	2,1022		-6,5042	8,1042
		1,00	3,0000	3,0773		-9,3232	15,3232

Homogeneous Subsets

FINAL

		N	Subset for alpha = .05
	TIME		1
Scheffe	1,00	3	75,6667
	,00	15	77,8667
	2,00	6	78,6667
	Sig.		,543

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 5,294.

b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

APPENDIX G

MULTIPLE COMPARISONS OF THE EVENING STUDENTS PREFERENCE OF TIME AND THEIR FINAL EXAM SCORES

Dependent Variable: FINAL

			Mean Difference (I-J)	Std. Error	Sig.	99% Confidence Interval	
	(I) TIME	(J) TIME				Lower Bound	Upper Bound
Scheffe	,00	1,00	,3929	1,9232	,979	-6,2280	7,0137
		2,00	3,2500	1,9232	,264	-3,3708	9,8708
	1,00	,00	-,3929	1,9232	,979	-7,0137	6,2280
		2,00	2,8571	1,9863	,375	-3,9808	9,6951
	2,00	,00	-3,2500	1,9232	,264	-9,8708	3,3708
		1,00	-2,8571	1,9863	,375	-9,6951	3,9808
Dunnett C	,00	1,00	,3929	1,9232		-8,1136	8,8993
		2,00	3,2500	1,9232		-4,6502	11,1502
	1,00	,00	-,3929	1,9232		-8,8993	8,1136
		2,00	2,8571	1,9863		-6,8341	12,5484
	2,00	,00	-3,2500	1,9232		-11,1502	4,6502
		1,00	-2,8571	1,9863		-12,5484	6,8341

Homogeneous Subsets

FINAL

		N	Subset for alpha = .01
	TIME		1
Scheffe	2,00	7	75,0000
	1,00	7	77,8571
	,00	8	78,2500
	Sig.		,272

Means for groups in homogeneous subsets are displayed.

a Uses Harmonic Mean Sample Size = 7,304.

b The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.