LEARNING STYLE PREFERENCES OF PREPARATORY SCHOOL STUDENTS AT GAZİ UNIVERSITY

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF SOCIAL SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY CEVRİYE GÜNEŞ

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR
THE DEGREE OF MASTER OF SCIENCE
IN
THE DEPARTMENT OF EDUCATIONAL SCIENCES

SEPTEMBER 2004

Approval of the Graduate School of Social Sciences

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ABSTRACT

LEARNING STYLE PREFERENCES OF PREPARATORY SCHOOL STUDENTS AT GAZİ UNIVERSITY

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September 2004, 126 pages

The purpose of this study was to determine the learning styles of preparatory school students from Gazi University and examine the relationship between students' learning style preferences (LSP) and faculty students will study in, gender, proficiency level of English and achievement scores on listening, reading, grammar, and writing in the English Course. The instrument, Index of Learning Styles (ILS), was administered to 367 randomly selected students. As for the data analysis, descriptive statistics portrayed the frequencies, percentages, means and standard deviations, the *t* test was conducted to see whether students' achievement scores differ according to their LSPs and the Crosstabs procedure was conducted to investigate whether the LSPs of the students at Gazi University differ according to faculty they will study in, gender and level of proficiency. The results indicated that there was no significant difference between students' LSPs and faculty, gender, level and achievement scores.

Key Words: Learning Style Preferences, Index of Learning Styles, Achievement Scores

ÖZ

GAZİ ÜNİVERSİTESİ HAZIRLIK SINIFI ÖĞRENCİLERİNİN ÖĞRENME STİLLERİ

Güneş, Cevriye
Yüksek Lisans, Eğitim Bilimleri Bölümü
Tez Yöneticisi: Yrd. Doç. Dr. Ahmet Ok
Eylül 2004, 126 sayfa

Bu çalışmanın amacı Gazi Üniversitesi hazırlık sınıfı öğrencilerinin öğrenme stillerini belirlemek ve öğrencilerin öğrenme stilleriyle eğitim görecekleri fakültelerinin, cinsiyetlerinin, İngilizce düzeylerinin ve İngilizce dersinde dinleme, okuma, dil bilgisi ve yazma konusundaki başarı puanları arasındaki ilişkiyi araştırmaktır. Araç, Öğrenme Stilleri İndeksi, rasgele seçilmiş 367 öğrenciye uygulanmıştır. Veri analizinde frekans, ortalamaları ve standart sapmaları hesaplamak için betimsel istatistik hesaplamaları, öğrencilerin başarı puanlarının öğrenme stillerine göre değişip değişmediğini öğrenmek için *t* testi ve öğrencilerin öğrenme stillerinin eğitim görecekleri fakülte, cinsiyet ve dil düzeyine göre değişip değişmediğini görmek için de Crosstabs yapılmıştır. Bulgular, öğrencilerin öğrenme stilleriyle fakülte, cinsiyet, dil düzeyi ve başarı puanları arasında belirleyici bir fark olmadığını göstermiştir.

Anahtar Kelimeler: Öğrenme Stilleri, Öğrenme Stilleri İndeksi, Başarı Puanları

To My Family

ACKNOWLEDGEMENTS

First of all, I would like to express my deep gratitude to my thesis supervisor Assist. Prof. Dr. Ahmet Ok for his constant patience, valuable input and precious suggestions. I would also like to express my deep gratitude to Prof. Dr. Hüsnü Enginarlar for his invaluable support and help.

I would also like to express my appreciation to my parents, my brother, Cevat Güneş, and Tolga Öztürk for their continuous support, constant encouragement, patience and understanding.

I would also like to thank Hadiye Yalçın, Hacer Demircan, Nehir Taşkın, Asu Şahin and Emine Kılıç for their tremendous friendship and understanding at all times.

TABLE OF CONTENTS

APPENDICES

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Human beings are unique among all living organisms in that their primary adaptive specialization lies in identification with the process of learning. We are learning species, and our ability to adapt not only in the reactive sense of fitting into the physical and social worlds, but in the proactive sense of creating and shaping those worlds (Kolb, 1984).

Learning a foreign language is a long and complex process. Your whole person is affected while trying to reach the confines of your native language and into a new language, a new culture, a new way of thinking, feeling and acting. Total commitment, total involvement, total physical, intellectual, and emotional response are necessary to successfully send and receive messages in a foreign language (Brown, 2000).

Teaching a language is an interesting and exciting occupation. Learning to use a language freely and fully is a lengthy and effortful process. Teachers cannot learn the language for their students. They can just help them to develop confidence in their own learning powers. Then, they should be ready to guide and assist the student if necessary. Some students may learn the language well, but it might be a really difficult task for others. Thus, as language teachers we should be patient and do our best to facilitate language learning (Rivers & Temperley, 1978).

The central misunderstanding of language teaching is to assume that structure is the basis of language and that mastery of the grammatical system is the prerequisite for effective communication (Hedgecock & Pucci, 1993). Traditionally, schools are involved in a highly traditional approach and most students feel that this traditional approach is the only way to become confident in their language knowledge. Although some teachers do not support the idea of traditional approach that is structure-oriented, they seem to get used to considering structure as the basis of foreign language acquisition (Buck, 1999; Thornbury, 1999).

As a matter of fact, before deciding upon a definite teaching approach, we should realize that every learner has his/her own way of learning. We learn by seeing and hearing, reflecting and acting, reasoning logically and intuitively, analyzing and visualizing. Teaching methods also vary. Some instructors lecture, others demonstrate or lead students to self-directory; some focus on principles and others on applications; some emphasize memory and others understanding. If the teaching style of the instructors doesn't match with the students' learning styles, the students may get bored and inattentive in class, do poorly on tests, and get discouraged about the courses, the curriculum, and themselves (Felder & Henriques, 1995). In any case, the students' learning styles should guide us and help to build the independent teaching style of the instructor. Within time, the instructor gains experience that is useful to determine the possible working teaching method according to the needs of the students.

Since student populations have become more diverse, the ability to teach to the needs of different learners has become increasingly important. But first of all we need to define the term "learning styles". Learning styles are defined as individual

differences in the way information is perceived, processed and communicated (Haar, Hall, Schoepp, & Smith, 2002). Silver, Strong & Perini (1997) claim that learning styles are concerned with differences in the process of learning and the theory centers on the content and products of learning. They are not fixed throughout life, but develop as a person learns and grows. Learning styles are cognitive, affective, and psychological traits that are relatively stable indicators of how learners perceive, interact with and respond to the learning environment (Keefe & Ferrell, 1990).

Providing a good language education for the university students in Turkey is one of the major goals of the National Education System. Since the foundation of the Turkish Republic, education has become a very important subject of interest which aims at preserving and developing the national, moral, human and cultural value of the Turkish Nation (Özal, 1989). The demand for higher education in Turkey has rapidly increased due to the growth of population and the development of national economy. As a result of this demand, many new universities are being established. Also, the number of English-medium universities is increasing. Many universities as well as Gazi University where this study will take place in have one-year preparatory classes. During this one year, students study only a foreign language (English, German or French) (Gürüz, 2001).

As Shroeder (1993) claims contemporary university students are seen as hopelessly underprepared, or less bright or motivated than previous generations. Accordingly, they are different from their instructors who perceive knowledge and derive meaning in a different way. We can say that student profile is changing on campuses today and there is a much greater variation in the range of learning style preferences to be considered. In order to fulfill the needs of the contemporary

university students, their learning style preferences can be discovered. Then, an overall understanding of how students learn and where they are in the process can help us understand students' learning style preferences and formulate teaching activities in accordance.

1.2 Purpose and Problem Statement of the Study

The purpose of this study is to determine the learning styles of preparatory school students coming from different faculties at Gazi University and to find out whether there is any relationship between students' learning style preferences and faculty they will study, gender, proficiency level of English and achievement scores on listening, reading, grammar, and writing in the English Course. Thus, this study will focus on the following research questions:

1. What are the learning style preferences (LSP) of the students at Gazi University Preparatory School in terms of four dimensions suggested by Felder (1988)?
2. Do students' English language achievement scores differ according to their LSP?

2.1 Do English language listening scores differ according to students' LSP?

2.2. Do English language reading scores differ according to students' LSP?

2.3. Do English language grammar scores differ according to students' LSP?

2.4. Do English language writing scores differ according to students' LSP?

3. What are the LSPs of preparatory school students according to faculty they will study in?

3.1. What is the LSP of the students from Faculty of Education?

3.2. What is the LSP of the students from Faculty of Engineering?

3.3. What is the LSP of the students from Faculty of Administration?

3.4. What is the LSP of the students from Faculty of Medicine?

4. What are the LSPs of preparatory school students according to gender?

4.1 Are female students active or reflective, sensing or intuitive, visual or verbal and sequential or global?

4.2 Are male students active or reflective, sensing or intuitive, visual or verbal and sequential or global?

5. What are the LSPs of preparatory school students according to level (beginner-elementary-intermediate-upper intermediate)?

5.1 Are beginner students active or reflective, sensing or intuitive, visual or verbal and sequential or global?

5.2 Are elementary students active or reflective, sensing or intuitive, visual or verbal and sequential or global?

5.3 Are intermediate students active or reflective, sensing or intuitive, visual or verbal and sequential or global?

5.4 Are upper intermediate students active or reflective, sensing or intuitive, visual or verbal and sequential or global?

1.3 Significance of the Study

Turkey is a developing country and tries to follow the new trends that may help us –Turkish citizens- to reach the developed countries. Although the developments should be in all areas of our lives, we have to make the major changes in our educational system and ways of teaching. Education is one of the effective tools that

help nations achieve their aims. The educators should do their best to bring up effective, productive, prospective, and qualified manpower. Teaching a foreign language, at that point, is very important, too. This may help future manpower to have good communication skills in the world marketplace.

However, teaching a language requires variety. In this study, it is aimed to discover the LSP of preparatory school students at Gazi University. Being aware of the learning style preferences of the students may help the educators to be much more effective in the classroom because then, the school curriculum may be reshaped in accordance with the findings. Knowing the students, their likes, dislikes, easy ways of learning, may facilitate both teaching and learning and make this learning-teaching cycle much more effective.

Besides knowing the learning style preferences of students, students should also be aware of their learning style preferences. Jaouen (1990) claimed that helping students understand learning styles lets them see new perspectives and increases their tolerance for each other's differences. Hand (1990) also agreed on this issue. She stated that knowledge of learning styles is not only a powerful tool for teachers, but equally valuable to students. By examining their own and their classmates' learning styles, students can learn new strategies for accomplishing tasks. Afterwards, they gain confidence in their strengths and develop diverse strategies for coping with the challenging situations.

This study will be useful not only for the instructors at universities with similar curricula but also for the students who will be able to come across their learning style preferences that will help them to acquire a foreign language easier, more practical and more enjoyable. As Hand claims (1990) students may begin to see how they

learn most effectively and efficiently; therefore, they will be able to take responsibility for their own learning. And, most important, students learn that their ways are not better or worse than those of their peers-they are simply different.

1.4 Definitions of Terms

Learning Style: "The ways in which an individual characteristically acquires, retains, and retrieves information are collectively termed the individual's learning style" (Felder and Henriques, 1995).

Index of Learning Styles Questionnaire: "An instrument used to assess learners learning style preferences based upon Felder-Silverman Learning Style Model" (Felder, 1996).

Listening: "Listening is an active process of constructing a message from a stream of sound with what one knows of the phonological, semantic, and syntactic potentialities of the language" (Rivers and Temperley, 1978).

Reading: "Reading comprehension process is the reader's ability to obtain information for some purpose and to find out some information to check or clarify" (Doff, 1988).

Grammar: "It is the way in which words change themselves and group together to make a sentence. The grammar of a language is what happens to words when they become plural or negative, or what word is used when we make questions, or join two clauses to make one sentence" (McDonough and Shaw, 1993).

Writing: "Writing implies knowledge of the conventions of the written code; to be effective, it needs the precision and nuances which derive from a thorough understanding of the syntactic and lexical choice the language offers; to be

interesting, it requires the ability to vary structures and patterns for rhetorical effect" (Rivers and Temperley, 1978).

Faculty: "A group of related departments in a university" (Crowther, 1995). In this study, there were students from five faculties: Faculty of Education, Faculty of Engineering, Faculty of Administration, and Faculty of Medicine.

Level: In this study level is the proficiency value of the students. There are four levels at Gazi University Preparatory School. The first level is level A which is upper-intermediate level. Level B is intermediate level. Level C is elementary level. And, Level D is beginner level.

CHAPTER 2

LITERATURE REVIEW

In this chapter, the development of learning style, the learning style models and research abroad and in Turkey will be reviewed.

2.1 What is Learning Style?

Learning style (LS) is the way in which each person begins to concentrate on, process, and retain new and difficult information through different perceptual channels. Styles pertain to the person as an individual, and that differentiate her/him from someone else. It is generally assumed that LS refer to beliefs, preferences, and behaviors used by individuals to aid their learning in a given situation (Brown, 2000; Dunn & Griggs, 1998; Hohn, 1995). People may learn in slightly different ways or extremely different ways (Dunn & Griggs, 1998). For example, think about how you learn the names of people you meet. Do you learn a name better if you see it written down? If so, you may be a visual learner, one who learns best by seeing or reading. If you learn a name better by hearing it, you may be an auditory learner (Slavin, 2000).

Although some gifted people may learn proficiently without using their learning-style preferences, low achievers perform better when they do, rather than when they don't. A decade of research demonstrates that both low and average achievers earn higher scores on standardized achievement tests and attitude tests when taught through their learning style preferences (Dunn & Griggs, 1998).

Students have different characteristic strengths and preferences in the ways they take in and process information. Their learning styles will be influenced by their genetic make-up, their previous learning experiences, their culture and the society they live in. Some students may focus on facts and data; others are more comfortable with theories and mathematical models. Some respond strongly to visual forms of information, like pictures, diagrams, and schematics; others get more from verbal forms like written and spoken explanations. Some prefer to learn actively and interactively; others function more introspectively and individually (Felder, 1996).

Even among family members, learning styles vary. Mothers and fathers tend to have completely opposite learning styles, children often reflect the partial style of one parent but not the other. Siblings learn differently from each other, and offspring do not necessarily reflect either parent's style. Apart from genetic make-up, students develop their learning styles by means of their experiences. Developmental elements of learning styles include motivation, a need for less or more structure, conformity or nonconformity, sociological preferences for learning. Preferences for learning styles change over time. However, during a period in which an individual has strong style preferences, that person will achieve most easily when taught with strategies and resources that complement those preferences. Although many people can learn basic information through an incompatible style, even accomplished professionals learn most easily through their learning style strengths. No single style is better or worse than any other (Dunn, 1999; Dunn & Griggs, 1998).

2.2 Development of Learning Style

Nowadays researchers try to find out successful, cheap and practical ways to practice in classrooms. There are various studies some of which support the aim and some others may not achieve the expected results. Anyway, achieving their aims or not, all the theories serve the educational system.

Learning-style theory which has its roots in psychoanalytic community is just one of these enterprises and emphasizes the different ways people think and feel as they solve problems, create products, and interact with other people (Silver, Strong & Perini, 1997).

Learning-style theory begins with Swiss psychologist Carl Jung in the second decade of the 20th century with his psychological types, another way in which he looked at the process of individuation (Arraj, 1991). He reconceptualized human difference as perception (how we absorb information), and judgment (how we process the absorbed information). He claims that information is perceived either concretely through sensing or abstractly through intuition. Then, information is judged either through the logic of thinking or the subjectivity of feeling. These are Jungian four functions – sensing, intuition, thinking, and feeling- that exist in every individual. One of these functions is dominant, one is auxiliary and ranks as the second most used function, and the third is the tertiary function that is not used too often and demands more energy to use. The fourth function is a person's inferior or shadow function and is too weak to use (Silver, Strong & Perini, 2000).

Isabel Myers and Katherine Briggs, who created the Myers-Briggs Type Indicator (MBTI) and founded the Association of Psychological Type, applied Jung's work and influenced a generation of researchers trying to understand specific differences in

human learning (Schroeder, 1993). They indicated the psychological type in individuals as introversion/ extraversion, sensing/ intuition, thinking/ feeling, and judging/ perceiving (Mamchur, 1996).

The term 'learning styles' is generally assumed to refer to beliefs, preferences, and behaviors used by individuals to aid their learning under the classroom or environmental conditions (Borich & Tombari, 1997; Hohn, 1995). Learning styles appear to occur in three areas: *cognitive*, *psychological*, and *affective*. Cognitive styles have been defined in terms of the way a person perceives, remembers, thinks, and solves problems. Psychological styles are biological and include reactions to the physical environment that may affect learning (e.g., being a "night person" or preferring to study in a warm or a cold room). Affective styles include personality and emotional characteristics such as persistence, preferring to work with others or alone, and rejecting or accepting external reinforcement (Borich & Tombari, 1997; Hohn, 1995; Slavin, 2000).

There are several other differences in learning styles that educational psychologists have studied. One has to do with *field dependence* versus *field independence*. Field-dependent individuals tend to see patterns as a whole and have difficulty separating out specific aspects of a situation or pattern; field-independent people are more able to see the parts that make up a large pattern. Field-dependent people tend to be more oriented toward people and social relationships than are field-independent people. For example, they tend to be better at recalling such social information as conversation and relationships, to work best in groups, and to prefer such subjects as history and literature. Field-independent people do well with

numbers, science, and problem-solving task (Borich & Tombari, 1997; Brown, 2000; Hohn, 1995; Slavin, 2000).

Field-independent learners prefer to work alone, are able to more effectively organize their efforts in working on projects and problem-solving tasks, and prefer to set their own goals. Field-dependent learners, on the other hand, prefer to learn in groups, prefer to interact frequently with the teacher, and require more external reinforcement and teacher structuring of tasks (Borich & Tombari, 1997; Brown, 2000; Hohn, 1995; Slavin, 2000).

Another cognitive style entails conceptual tempo. It is common for us to show in our personalities certain tendencies toward reflectivity sometimes and impulsivity at other times. Impulsive learners work fast to get an answer, are more easily frustrated and more distractible, and are more likely to take risks than reflective children who work more slowly to avoid errors. Reflective learners are slower but more accurate than impulsive learners especially in reading (Brown, 2000; Hohn, 1995).

Another key researcher in this area is Anthony Gregorc and the third cognitive style is Gregorc's thinking style. Grecorc categorizes thought into two dimensions: concrete-abstract and sequential random. He delineated four learning/ teaching channels: concrete sequential (hardworking, conventional, accurate, stable, dependable, consistent, factual, organized) abstract sequential (analytic, objective, knowledgeable, thorough, structured, logical, deliberate, and systematic), abstract random (sensitive, compassionate, perceptive, imaginative, idealistic, sentimental, and flexible), and concrete random (quick, intuitive, curious, realistic, creative, innovative, instinctive, and adventurous). He states that learning styles are not fixed throughout life, but develop as a person learns and grows. In order to develop one's

learning style, a safe learning environment should be provided. A safe place is safe emotionally, physically and intellectually. Individuals, especially teenagers need to challenge authority and test their own ideas. That is possible in a place where they can question and inquire and in such a place true learning exists (Gregorc & Butler, 1984).

Dunn and Dunn (2003) include five stimuli categories-environmental, emotional, sociological, physiological, and psychological- in their model. Environmental elements of learning style such as sound, light, temperature, and design affect the way that a learner takes in new and difficult information. Emotional elements include motivation, persistence, responsibility, and structure. Sociological elements deal with self, pair, peer and team, and adult. Physiological elements are perceptual elements, food and drink intake, time of day, and mobility. Psychological stimulus is related with cognitive processing and includes global-analytic and impulsive-reflective elements and hemisphericity.

Kolb (1985) thought of the learning styles as a continuum that one moves through over time, usually people come to prefer, and rely on, one style above the others (ed. in Henke, 2001). There are four basic learning modes – concrete experience (sample word, feeling), reflective observation (watching), abstract conceptualization (thinking), and active experimentation (doing) - that are closely tied to the learning styles: *The convergent learning style* relies on the dominant learning abilities of abstract conceptualization and active experimentation. *The divergent learning style* emphasizes concrete experience and reflective observation. In *assimilation*, the dominant learning abilities are abstract conceptualization and reflective observation.

The accommodative learning style emphasizes concrete experience and active experimentation (Kolb, 1984).

Felder and Silverman have synthesized findings from many studies to formulate their own learning style model with dimensions that should be particularly relevant to science education. This model of learning styles and a parallel model of teaching styles are being developed with Soloman. The idea is not to teach each student exclusively according to his or her preferences, but rather to strive for a balance of instructional methods. If the balance is achieved, students will be taught partly in a manner they prefer, which leads to an increased comfort level and willingness to learn, and partly in a less preferred manner (Felder & Soloman, 1998).

According to Felder (1993), a student's learning style may be defined in part by the answers to five questions:

1. What type of information does the student preferentially perceive: *sensory* – sights, sounds, physical sensations, or *intuitive* – memories, ideas, and insights?
2. Through which modality is sensory information most effectively perceived: *visual* – pictures, diagrams, graphs, demonstrations, or *verbal* – sounds, written and spoken words and formulas?
3. How does the student prefer to process information: *actively* – through engagement in physical activity or discussion, or *reflectively* – through introspection?
4. How does the student progress toward understanding: *sequentially* – in a logical progression of small incremental steps, or *globally* – in large jumps, holistically?

There are many learning style profiles available today. Each of them has their strong points. The reason that they are so different is that they are assessing different

things (Jensen, 1996). Learning style researchers tend to investigate only a part of the whole (Curry, 1990). The human brain is a complex multi-processor. To get a clearer understanding of how human learns, it makes more sense to sub-divide the learning process into four categories (Jensen, 1996):

1. *Context*: The circumstances of learning provide clues about the learning process. There are contextual factors that may help for maximum success. While the field-dependent learner learns best in natural contexts like field trips, experiments and in situations where the learning would naturally occur, the field-independent learner prefers irrelevant contexts and uses computers, textbooks, and classrooms. Some learners study better in a flexible environment and others study better in a more structured environment. Whereas some learners prefer to study independently, others may prefer to study with peers or groups.

2. *Input*: All learners have some input to initiate the learning. Human beings have five senses and their learning is shaped by means of these senses. Some of the learners learn externally and others internally. For example, visual external learners prefer visual input, enjoy writing and have problems with verbal instructions. Visual internal learners, on the other hand, prefer visualize the learning before it is presented. Auditory external learners prefer input to be auditory, talk constantly, either to self or others, like discussions unlike the auditory internal learners who prefer to talk to themselves before learn about something and hold nearly endless conversation. Kinesthetic tactile learners prefer physical input and want to learn by doing. In comparison with tactile learners, kinesthetic internal learners prefer to first experience feelings about something before learning it or doing it.

3. *Processing*: You can process globally or analytically, concrete or abstract, multi-task or single-task etc. Contextual global learner is often referred as a "right-brain" learner. This kind of learner learns with pictures, symbols, icons and themes. Moreover, such learners prefer multi-tasking…means they prefer to work on many problems at the same time. Sequential detailed/linear learners, on the other hand, are left-hemisphere dominant. They prefer writing, clear and detailed instructions, structured lessons and they can only focus on a single problem or task. Conceptual (abstract) learners prefer the world of books, words, computers, ideas whereas concrete learners prefer specific and concrete examples.

4. *Response Filters*: After taking the information and processing it, the learner is likely to do something about it. They are reaching the learning. Externally referenced learners use society's norms and rules for source of their behavior, but internally referenced ones set their own rules. Matchers approves of something that has been done before, that fits in to an overall plan and that is generally consistent with the rest of the learning. They respond by noting similarities unlike mismatches who respond by noting differences. Such learners want more variety, enjoy experimenting and dislike traditional lesson plans. Some other learners, impulsive experimental ones, respond with immediate action on thoughts and are more likely to be present oriented whereas analytical reflective learners are more likely to be past or future oriented and respond internally.

2.3 Learning Style Models

As Felder and Henriques (1995) pointed out, over 30 learning style models have been developed in the past three decades. A few of these models will be reviewed.

2.3.1 Jungian Psychological Type and Myers-Briggs Type Indicator (MBTI)

In his theory of psychological types, Jung developed a holistic framework for describing differences in human adaptive processes. He began by distinguishing between those people who are oriented toward the external world and those oriented toward the internal world (Kolb, 1984). According to Jung, human difference is based on perception and judgment. His theory is that we are constantly choosing between the open act of perceiving (through sensing and intuition) and the closed act of judging (through thinking and feeling) (Mamchur, 1996; Silver et all, 2000). In his view, human individuality develops through transactions with the social environment that reward and develop one function over another. Jung saw that this specialized adaptation is in service of society's need for specialized skills to meet the differentiated, specialized role demands required for the survival of and development of culture. He saw a basic conflict between the specialized psychological orientations required for the development of society and the need for people to develop and express all the psychological functions for their own individual fulfillment (Kolb, 1984).

Mode of relation to the world	**E** EXTROVERT TYPE Oriented toward external world of other people and things	**I** INTROVERT TYPE Oriented toward inner world of ideas and feelings
Mode of decision making	**J** JUDGING TYPE Emphasis on order through reaching decision and revolving ideas	**P** PERCEIVING TYPE Emphasis on gathering information and obtaining as much data as possible
Mode of perceiving	**S** SENSING TYPE Emphasis on sense perception, on facts, details, and concrete events	**N** INTUITION TYPE Emphasis on possibilities, imagination, meaning, and seeing things as a whole
Mode of judging	**T** THINKING TYPE Emphasis on analysis, using logic and rationality	**F** FEELING TYPE Emphasis on human values, establishing personal friendships, decisions made mainly on beliefs and likes

Figure 1 Jung's Psychological Types (Kolb, 1984, p.80)

The Myers-Briggs theory of personality type grew out of the work of Carl Jung and two American women, Katharine Briggs and her daughter Isabel Briggs Myers. The Myers-Briggs Type Indicator (MBTI) is a widely used psychological self-report instrument used to assess people's orientation toward the Jungian types. Being interested in the differences and similarities between human personalities, they developed a model of personality type based on Jung's theories. After years of research, they determined that there are four personality dimensions and 16 distinct personality types. The MBTI, being widely used in educational, career, and family counseling settings, identifies the preferred way an individual perceives (gathers data) and judges (makes decisions), according to four dichotomies (Cooper, 2001; Kolb, 1984):

(1) *Extraversion or Introversion (E-I)*

The E-I dichotomy is designed to reflect what a person's basic attitude or orientation toward life is. *Extraversion* is an outward focusing of energy. It causes the person to seek outside influences as a source of energy, pleasure and satisfaction. Extravert learners prefer interaction with others, and are action oriented. They find energy in things and people and like to learn together. Also, they like to think out loud and really don't know what they know until they have the chance to talk it out. Talking is a clarifying process. They enjoy variety and prefer to experience a whole range of activities, focusing finally on a few of the activities. And finally, extraverted learners need feedback from the teacher and from their peers because they want to know how they are doing. That's why the teacher should create a classroom in which extraverts have some opportunity to talk and discuss, to present their ideas, and to move (Brightman, 1998; Cooper, 2001; Mamchur, 1996).

Introversion, on the other hand, is an inward focusing of energy. It causes the person to look inward for sources of energy, satisfaction, and safety, and to enjoy intense, focused relationships and events. Introverts find energy in the inner world of ideas, concepts, and abstractions. They need to think everything through inside their heads, before they risk responding in front of others. When they trust their teacher and are confident of their knowledge, they can surprise everyone with unexpected and intense responses. Introverts want to understand the world. They are concentrators and reflective thinkers. The teacher should design a classroom that allows introverts time and space to think and learn (Brightman, 1998; Cooper, 2001; Mamchur, 1996).

(2) *Sensing or Intuition (S-I)*

The S-I dichotomy reflects an individual's preference between two opposite ways of perceiving or becoming aware of things, people, happenings, and ideas. *Sensing* is the perceiving function that seeks immediately relevant and accessible experience through the senses. It causes the person to pay careful attention to each detail in her/his immediate environment in a practical, focused way. Sensing involves observing, gathering data through the five senses- hearing, sight, taste, smell, and touch. Sensing people are detail oriented, want facts, and trust them and they prefer organized, linear, and structured lectures. They move cautiously into new learning, prefer a set procedure, and usually learn one step at a time. Accordingly, the teacher should design the program by breaking it down into the component parts. S/he proceeds slowly and allows students plenty of time for observation and practice (Brightman, 1998; Cooper, 2001; Felder & Henriques, 1995; Silver et all, 2000).

Intuition is the perceiving function that makes sense of the world by creating patterns and inventing hypothesis. It causes the person to scan situations and data in order to see relationships between things in way that is self-inspiring and inventive. Intuition involves indirect and more abstract perception. Intuitive people seek out patterns and relationships among the facts they have gathered. They get bored easily and seek variety in how and what they learn. They dislike repetition and resent it deeply when the teacher forces them into a review situation. As a result, the teacher designs a variety of activities that provide intuitive students with plenty of opportunities to invent, guess, teach, and work

independently beyond the scope of the program (Brightman, 1998; Cooper, 2001; Felder and Henriques, 1995; Silver et all, 2000).

(3) *Thinking or Feeling (T-F)*

The T-F dichotomy reflects a person's preference between two contrasting ways of making judgments or decisions or coming to conclusions about what has been perceived. *Thinking* is the judgment function that values objective, analytical ways to make decisions and evaluate situations. It causes the person to stand back, remaining cool and a bit unfriendly so that s/he can think logically and rationally, honestly and fairly, and, if necessary, critically. Through thinking we employ logic, reason, and evidence to analyze it. This function values objective, analytical ways to make decisions and evaluate situations. Thinking learners value fairness and make decisions impersonally on the basis of logical consequences. They need well-organized, logically developed courses of study and value, respect, and expect expert knowledge. Therefore, the teacher should design well-organized programs, a clear course, and topic objectives (Silver et all, 2000; Mamchur, 1996; Cooper, 2001; Brightman, 1998).

Feeling is the judging function that value subjective analysis and empathetic understanding as a means of decision making and evaluation. It causes the person to seek a personal and harmonious relationship with the environment, relying on a deep sense of personal values to guide behavior and judge the behavior of others. Feeling causes the person to orient toward relationships and to attend to build harmony around them. Feeling learners value harmony and make decisions primarily on the basis of personal or social values. They focus on human values and needs as they make decisions or arrive at judgments. They

like working in groups, especially harmonious groups and rarely appreciate competition. Above all, the teacher needs to be genuine and empathetic. In Jung's and Myers' approaches, the term *thinking* does not imply intelligence or competence, and the term *feeling* does not imply emotion (Brightman, 1998; Cooper, 2001; Mamchur, 1996; Silver et all, 2000).

(4) *Judging or Perceiving (J-P)*

The J-P dichotomy identifies the attitude or orientation an individual uses in dealing with the outer world, the extraverted part of life. *Judging* is a preference to deal with the world by decisively acting to create order. Judging causes the person to want to create an ordered world in which things can happen on time according to a predetermined purpose. Judging people are decisive and organized. They like to plan and schedule and need exact dates regarding course progress, exams, and assignment deadlines. They only focus on essentials and take action quickly. They plan their work and work it. And the teacher has to plan the course, avoid surprises, and give consistent feedback or arrange for peer feedback (Brightman, 1998; Cooper, 2001; Mamchur, 1996).

Perception is a preference to deal with the world by following one's curiosity and seeking understanding. It causes the person to resist structure and to favor changing circumstances in the quest for spontaneity and surprise. Perceptive people are curious, adaptable and spontaneous. They start many tasks, want to know everything about each task, and often find it difficult to complete a task. Their teachers must provide plenty of opportunities for perceiving students to explore and discover (Brightman, 1998; Cooper, 2001; Mamchur, 1996).

2.3.2 Kolb's Learning Style Model

Kolb's learning cycle is useful for conceptualizing how people learn and for developing courses and training programs (Blackmore, 1996; Henke, 2001). This model classifies students as having a preference for (1) concrete experience or abstract conceptualization (how they take information), and (2) active experimentation or reflective observation (how they internalize information) (Felder, 1996).

Kolb's Learning Style Inventory (LSI) includes four basic learning modes that are defined as follows (Kolb, 1984):

a) An orientation toward *concrete experience* focuses on being involved in experiences and dealing with immediate human situations in a personal way. People with a concrete-experience orientation learn from their feelings or reactions. They have good relations with others. They are often good intuitive decision makers and function well in unstructured situations. The person with this orientation values relating to people and being involved in real situations, and has an open-minded approach to life.

b) An orientation toward *reflective observation* focuses on understanding the meaning ideas and situations by carefully observing and impartially describing them. Watching and listening influence people with a reflective orientation. They enjoy intuiting the meaning of situations and ideas and are good at seeing their implications. They are good at looking at things from different perspectives and at appreciating different points of view. They like to rely on their own thoughts and feelings to form opinions. Such people are patient and thoughtful.

c) An orientation toward *abstract conceptualization* is based on logic, ideas, and concepts. People with an abstract-conceptual orientation are good at systematic planning, manipulation of abstract symbols, and quantitative analysis. They value accuracy and the artistic quality of an efficient conceptual system.

d) An orientation toward *active experimentation* focuses on actively influencing people and changing situations. People with an active-experimentation orientation learn by doing or practicing and they like to take risks to achieve their objectives. They like to influence people around them and to see the results.

Kolb's Learning Style Inventory (LSI) also involves four basic learning styles that are based upon both research and clinical observation of heredity, age, school, work of LSI scores (Kolb, 1984):

a) *The convergent learning style* relies primarily on the dominant learning abilities of abstract conceptualization and active experimentation. The greatest strength of this approach lies in problem solving, decision making, and the practical application of ideas. *Converger* wants to solve a problem and relies upon hypothetical-deductive reasoning. Convergers prefer dealing with technical tasks and problems rather than social and interpersonal tasks.

b) The divergent learning style has the opposite learning strengths from convergence, emphasizing concrete experience and reflective observation. The greatest strength of orientation lies in imaginative ability and awareness of meaning and values. *Diverger* solves problems by viewing situations from many perspectives and relies heavily upon brainstorming and generations of

ideas. Diverger is interested in people and tends to be imaginative and feeling-oriented.

c) In *assimilation*, the dominant learning abilities are abstract conceptualization and reflective observation. *Assimilator* solves problems by inductive reasoning and ability to create theoretical models. As in convergence, this orientation is less focused on people and more concerned with ideas and abstract concepts. Ideas, however, are judged less in this orientation by their practical value. It is more important that the theory be logically sound and precise.

d) *The accommodative learning style* has the opposite strengths from assimilation. The dominant learning abilities are concrete experience and active experimentation. The greatest strength of this orientation lies in doing things, in carrying out plans and tasks and getting involved in new experiences. *Accommodator* solves problems by carrying out plans and experiments, adapting to specific immediate circumstances, and solving problems relying heavily on other people for information rather than on their own analytic ability. (Figure 2)

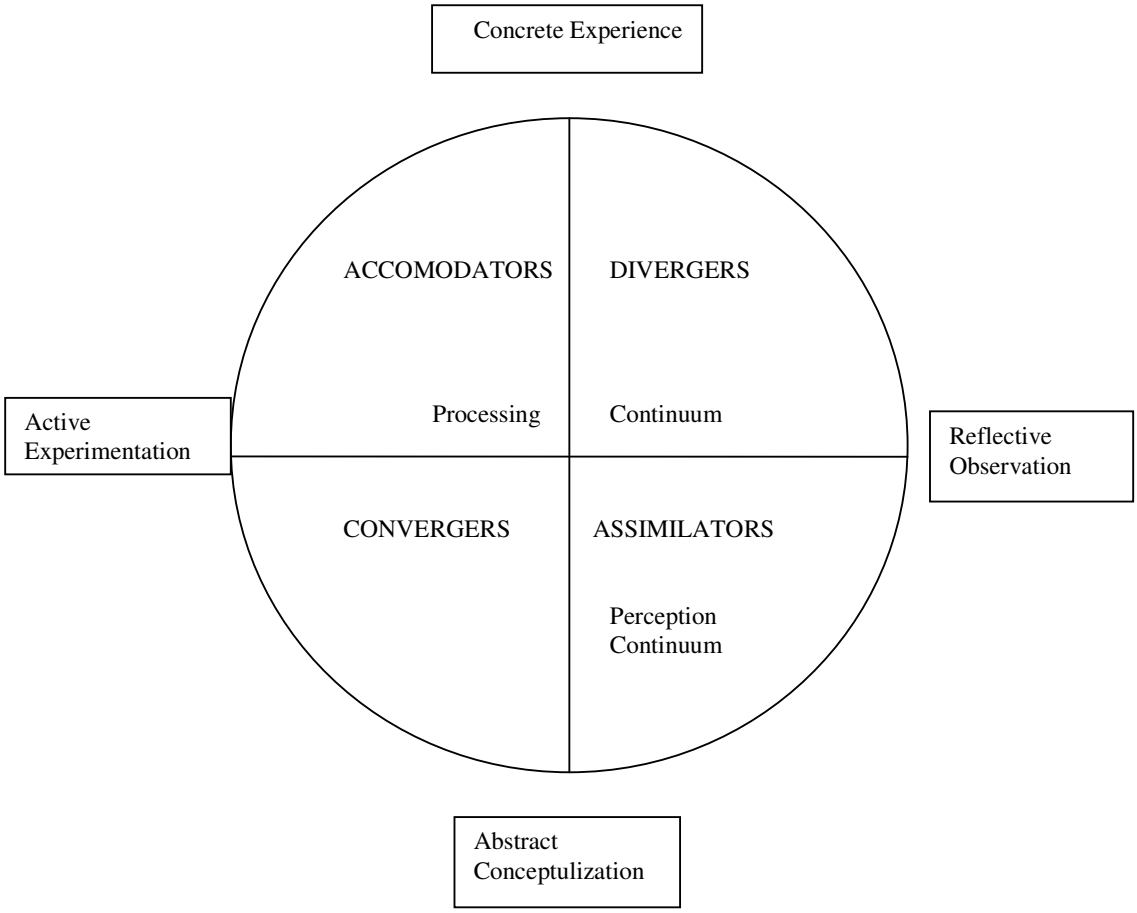


Figure 2 Kolb's Learning Style Model

These four basic modes are tied into the four basic learning styles. For instance, a converger favors a learning cycle of Abstract Conceptualization and Active Experimentation, which fits since these two learning cycles are characterized by doing and thinking. And since convergers focus on reasoning and solving problems, the cycles and learning styles are tied together (Henke, 2001).

2.3.3 McCarthy's Learning Style Model

In 1972, McCarthy (1990) developed the 4MAT System to help teachers organize their teaching based on differences in the way people learn. 4MAT System is an eight-step cycle of instruction that emphasizes individual learning styles and brain dominance processing preferences. 4MAT is based on research from the fields of education, psychology, neurology, and management. There are two major premises in the 4MAT System: (1) people have major learning styles and hemispheric (right/left-mode) processing preferences; and (2) designing and using multiple instructional strategies in a systematic framework. McCarthy(1990) states that differences in our learning styles depend on who we are, where we are, how we see ourselves, what we pay attention to, and what people ask and expect of us.

Kolb (1984), whose model forms the theoretical base for 4MAT, described two major differences in how people learn: how they *perceive* and how they *process.* Each person perceives differently in new situations. Some people respond by sensing and feeling, whereas others think things through. Perception alone, however, does not equal learning. People also process experience and information differently. While some people are watchers who reflect on new things, filter them through their own experience to create meaning in a slow, deliberate choosing of perspectives, others are doers who act on new information immediately and reflect only after they have tried it out. Based upon perceiving and processing, McCarthy formed a four-quadrant model that includes four major learning styles (McCarthy, 1990):

Type One-Imaginative Learners: Imaginative learners look for personal meaning and draw on values while learning (Verster, 2003). They perceive information concretely and process it reflectively. They integrate experience with the self.

They believe in their own experiences, but also seek commitment and are interested in people and culture. Sometimes, they have difficulty making decisions because they see all sides. According to them, school is too fragmented and disconnected from the personal issues that they find most interesting.

Type Two-Analytic Learners: Analytic learners perceive information abstractly and process it reflectively. They integrate their observations in what they know. They want to develop intellectually and draw on facts while learning by thinking through ideas. They need to know what the experts think and need details. They are systematic and productive. They are highly skilled verbally and, generally, enthusiastic readers. And, school is well suited to their needs.

Type three-Common Sense Learners: Type Three learners perceive information abstractly and process it actively. They integrate theory and practice, learning by testing theories and applying common sense. While they like to find solutions, they resent being given answers. They are pragmatists (They believe if something works, then use it.), kinesthetic and practical. As real problems seem to be more attracting, they do not like school because they do not have the chance of immediate use of what they are learning.

Type Four-Dynamic Learners: Type Four learners perceive information concretely and process it actively. They integrate experience and application. They look for hidden possibilities because they like change and taking risks. They judge things by good reactions and synthesize information from different sources. Therefore, they are frustrated with the monotonous and overly sequential structure of schools where it is not possible to pursue their interests in diverse ways.

As a learner-focused model for adapting curriculum and instruction to the diverse needs of students, 4MAT benefits teachers by giving them a framework to design learning activities in a systematic cycle. By examining the primary characteristics in each quadrant of the cycle, the role shifts of teachers and learners become apparent. Each quadrant has its own function. *Quadrant One*'s (WHY?) emphasis is on meaning, or how the material to be learned is connected to learners' immediate lives. In Quadrant One, the principal has to articulate the meaning of school through her/his vision, the teacher has to connect meaning to content, and the student has to be able to communicate with her/his peers and teachers bout content that connects to their lives. *Quadrant Two*'s (WHAT?) emphasis is on content and curriculum and the importance of delivering instruction through an integrated approach. In Quadrant Two, the principal is the instructional coordinator who arranges the curriculum with the mission statement and holds the idea of process and product as parallel goals, the teacher is the instructional leader who manages and delivers knowledge units with conceptualized themes, and the student is the comprehender who understands these units at conceptual level. *Quadrant Three* (HOW DOES THIS WORK?) addresses the usefulness of learning in the lives of learners both in and out of school. The principal arranges time, money, and materials, sets up environments open to testing and experimenting, generates opportunities, and honors multiple methods of instruction. In other words, s/he is the facilitator of resources. The teacher is the sponsor and practice coach and leads students to the use and integration of the material learned and the student is the user of content and skills. *Quadrant Four* (IF?) encompasses creativity, how the learner adds to the original learning in new and unique ways. In this quadrant, the principal is the refocuser who

helps people learn from failure, coordinates evaluation, and enlarges diffusion networks. The teacher acts as the facilitator of creative options and encourages diverse use of learning, elaborates, critiques, and honors student's originality. The student is the innovator and applies learning in new ways (McCarthy, 1990).

2.3.4 Dunn and Dunn Learning Style Model

Rita Dunn (1984) defined learning styles as the ways in which each person absorbs and retains information and/or skills; regardless of how that process is described, it is dramatically different for each person. Rita Dunn and Kenneth Dunn (hereafter referred to as Dunn) call students' learning style preferences their strengths because their experiments- both in laboratories and in classroom studies- conclude that since students achieve better when taught through their preferences, their preference must be their strength (Dunn, 1984; Dunn, 1990).

According to learning-style theory, learners' cognitive, affective, and physiological patterns determine their academic outcomes. These patterns are relatively stable indicators of how individuals perceive, interact with, and respond to their instructional environment. Understanding the multi-dimensional aspects of learning has been proven by research conducted over more than three decades to be one of the few known ways of helping learners improve their capacity to concentrate, process information, remember new and difficult academic information. Most people have learning-style preferences, but individuals' learning style preferences differ significantly (Dunn & Griggs, 1998).

Dunn conducted studies to determine whether there is any relationship between cognitive dimensions and students' characteristics that appeared to be more or less

responsive to environmental, emotional, sociological, physiological, and psychological stimuli (Dunn & Griggs, 1998; Prescott, 2001).

Environmental elements of learning style such as sound, light, temperature, and design affect the learner's way of taking in new and difficult information. For example, while some prefer a quiet place to study, others prefer sitting in a room with the radio playing. Some learners may prefer soft and warm room and others may prefer bright light and a cool room while concentrating. *Emotional elements* of learning style (motivation, persistence, responsibility, structure) vary between self-motivated learners, who enjoy learning and achieving, and learners for whom academic learning in conventional classroom is not fulfilling. *Sociological elements* of learning style determine how students react to working alone, with an authority, in a pair, on a small team or group, on a large team or group, or in other varied circumstances. While some students prefer working independently, others prefer working with a pair or with peers or a team. *The physiological elements* of learning style are food and drink intake, time of day, mobility, and perceptual elements (visual, auditory, tactile, and kinesthetic preferences). Perceptual elements are of particular interest to teachers since they govern the reception and production of language. Some students feel that they need to have something to eat or drink while learning something new; others cannot learn while eating or drinking. Some learners prefer learning new and difficult material early in the morning, some others in the afternoon, evening, or late at night. The *psychological elements* of learning style present the terms analytic/global, left/right (hemispherity), and impulsive/reflective. These variables tend to parallel each other. Whereas global learners are concerned with the whole meaning and the end results, analytic learners prefer to learn one

detail at one time in a meaningful sequence. The learning related to brain hemispherity suggests that left-brain (sequential or analytic) thinkers deal more easily with grammatical structure and contrastive analysis, while right-brain (global) thinkers are better at learning language intonation and rhythms. And finally, impulsive learners draw conclusions and make decisions quickly unlike the reflective ones who think about various alternatives and evaluate each before making a decision (Dunn, 1984; Dunn & Griggs, 1998; Dunn & Dunn, 2003); Felder & Henriques, 1995; Prescott, 2001).

2.3.5 Herrmann Brain Dominance Model (Whole Brain Model)

Herrmann Brain Dominance Model is based on the split-brain research (left/right brain theory) and triune model (rational brain, intermediate brain and primitive brain) differentiating thinking by the right and left brain hemispheres, as well as cerebral and limbic sections (Herrmann, 2004). Herrmann (2004) suggests four quadrants of distinct groups of thinking activities as the following:

Quadrant A: (Left Cerebral) – problem solving, mathematical, technical, analytic, logic

Individuals with primary preferences in this quadrant are theorists. They like lecture, facts, and details, critical thinking, textbooks and readings. They tend to avoid emotion, intuition and ambiguity.

Quadrant B: (Left Limbic) – planning, controlled, conservative, administrative, organizational

Individuals with primary preferences in this quadrant are organizers. They prefer to learn by outlining, checklist, exercises and problem solving with steps, policies and procedures. They are very efficient and rely on the "tried and true".

Quadrant C: (Right Limbic) – conceptualizing, synthesizing, imaginative, holistic, artistic

Individuals with primary preferences in this quadrant are humanitarians who prefer cooperative learning and group discussion. They are empathetic, most receptive to moods and attitudes, and tend to rely on non-verbal communication. They may avoid facts and goals.

Quadrant D: (Right Cerebral) – talker, musical, spiritual, emotional, interpersonal

Individuals with primary preferences in this quadrant are innovators and they prefer brainstorming, metaphors, illustrations, and pictures and holistic approaches. They avoid structure, details and procedures.

A primary preference for a quadrant indicates the greatest preference for its characteristic processes. A person can also have secondary preferences and even avoidance towards types of thinking represented by other quadrants (Nasmyth, Schultz & Williams, 2002).

2.3.6 Felder-Silverman Learning Styles Model

This model like the Jung-Myers-Briggs model classifies learning styles into four dimensions: process, perception, input, and understanding. Felder and Silverman developed a self-scoring web-based instrument called the Index of Learning Styles (ILS) that assesses preferences on four scales of the learning style model (Felder, 2002).

Process dimension is grouped into two categories: *active experimentation and reflective observation*. Active experimentation involves doing something in the external world with the information. Active learners tend to be experimentalists who try things out and explain it to others. They work well in groups because they are able to become more active in a group. Reflective experimentation involves examining and manipulating the information introspectively. Reflective learners prefer to work alone or in pairs. They also learn by thinking things through and tend to be theoreticians. There are indications that engineers are more likely to be active learners rather than reflective learners. In fact, everybody is sometimes active and sometimes reflective. Your preference for one category or the other may be strong, moderate, or mild (Felder, 1988, 1993, 1996; Felder & Soloman, 1998).

Sensing and Intuitive Perception is the second dimension of this model. According to Jung's theory sensing involves observing, gathering data through the senses and intuition involves indirect perception by way of the unconscious – speculation, imagination, hunches. Sensing learners (sensors) tend to be practical, careful but slow; intuitive learners (intuitors) tend to be imaginative, quick but careless. Sensors often like solving problems by well-established methods, don't mind detailed work and dislike complications and surprises; intuitors like variety in their work, don't mind complexity, and get bored with too much detail and repetition. Sensors don't like abstract concepts, theories, and formulas (particularly physics and chemistry) and learn best when given facts and procedures; intuitors are often more comfortable with abstractions and mathematical formulations and become more successful in lecture courses. Intuitors may miss important details or make careless mistakes in calculations or hands-on work; sensors may rely on too much on

memorization and familiar methods and not concentrate enough on understanding and innovative thinking (Felder, 1988, 1993, 1996; Felder & Soloman, 1998).

Input dimension (Visual and Verbal Input) is the third dimension in this model. The preliminary version of input included the visual/auditory dimension, but Felder (2002) changed it into the visual/verbal dimension because auditory dimension included only spoken words and other sounds, but it did not include written prose. Therefore, Felder (2002) decided to change this dimension as verbal dimension includes both written and spoken words. Visual learners learn more from visual images – pictures, diagrams, flow charts, graphs, and demonstrations- than verbal material – written and spoken explanations, mathematical formulas. Felder (1993, 1998) claims that most students are visual learners; however, students mainly listen to lectures and read material written on boards and in textbooks rather than being presented visual material. Anyway, good learners are capable of processing information presented either visually or verbally (Felder, 1988, 1993, 1996; Felder & Soloman, 1998).

Understanding dimension (Sequential/Global) is the fourth dimension in this model. Sequential learners absorb information and acquire understanding of material in small connected chunks with each step following logically from the previous one; global learners absorb information in seemingly unconnected fragments, without seeing any connections, and achieve understanding in large holistic leaps. Sequential learners can work with material when they understand it partially or superficially, while global learners may have great difficulty doing so. Sequential learners may be strong in convergent thinking and analysis; global learners may be better at divergent thinking and synthesis. Sequential learners learn best when material is presented in a

steady progression of complexity and difficulty; global learners sometimes do better by jumping directly to more complex and difficult material. School is often a difficult experience for global learners who are synthesizers, multidisciplinary researchers, and system thinkers. In the schooling system, most courses are taught in a sequential manner, textbooks are sequential, and most teachers teach sequentially. It is difficult to understand global learners; thus, the teachers should provide the big picture of the subject before presenting the steps and detail. The students should be given the freedom to plan their own methods of solving problems rather than being forced to adopt the teacher's strategy. The teachers should provide students with creative activities and encourage students in solving them (Felder, 1988, 1993, 1996; Felder & Soloman, 1998).

Inductive and Deductive Organization was the last dimension in Felder-Silverman Learning Style Model, but it was omitted. Induction is a reasoning that proceeds from specific (observations, measurements, and data) to general (governing rules, laws, and theories).Induction is the natural learning style. For example, babies observe the world around them and draw inferences. Deduction, on the other hand, proceeds in the opposite direction. Deduction is the natural teaching style, at least at university level. Inductive learners prefer to learn a body of material by seeing specific cases first (observations, experimental results, numerical examples) and working up to governing principles and theories by inference; deductive learners prefer to begin with general principles and to deduce consequences and applications. According to Felder (1988), one problem with deductive presentation is that it gives a seriously misleading impression. This kind of presentation is perfectly ordered and concise and many students prefer deductive presentation. Inductive presentation

isn't concise and prescriptive. However, Felder (2002) is against deductive presentation that is traditional but less effective in his point of view. Therefore, he omitted this dimension from the model and the Index of Learning Styles (Felder, 1988, 1993, 2002).

2.4 Research on Learning Styles

There are many studies conducted on learning styles in the world and in Turkey.

Studies in the world: Many researchers have conducted their researches about learning styles with the theory of multiple intelligences. While teaching at a bilingual school from 1995 to 1997, Prescott (2001) was primarily interested in finding ways for teachers to help students take control of their own learning. She believed that through reflective learning in the target language, students could become more independent learners. The theoretical framework for this research was based on multiple intelligence theory and learning style theory. One of her goals was to discover their preferred learning styles and dominant intelligences. Her subjects were tenth-grade students in a survey English literature course. They ranged from fully bilingual and/or native speakers of English to Spanish speakers studying English as a foreign language. Students were in heterogeneous classes of linguistic backgrounds and ability levels. Learning statements, assigned throughout the school year on various learning topics, provided a student-written record and description of individual experiences learning in the target language, as well as experiences with group and solo class activities. Students were asked to respond in English to a variety of questions about their learning. The statements provided the springboard for discussions about multiple intelligences and learning styles, to promote students'

inductive, unbiased declarations of their learner identities. The first learning statements targeted general outcomes; for example, "Who or what has been particularly important to you in your growth as a thinker and a learner, and why?", and "What is working for you in this class? What needs to change?" Later questions became more pointed, starting the process of more specific thinking about learning: "State two or three things that you have learned recently. What activities, class discussions, or assignments helped you to learn these things? How do you know you learned them (how was mastery proved)?" Other topics asked students for more precision in describing how they studied for quizzes or in comparing and contrasting two different class activities to learn the same material. This led to questions asking students to predict test content: "Predict the format and content of the [X] test. Do you feel well prepared? If so, what has been helpful? If not, why not? What type of review would you like to have? How can you make the review effective?" Before students looked at a Learning Styles Inventory at year's end, they wrote reflective responses about a time when trying to learn something new and difficult was frustrating for them. They then hypothesized why learning did not take place. That was a prelude to self-identification and self-discovery with the Learning Styles Inventory. According to the results learners vary greatly in both multiple intelligences and learning styles and these are revealed through reflective writing in the classroom. Environmental elements of learning style affect the way that a learner takes in new and difficult information. For some, finding a quiet place to study means sitting in a room with the radio playing. For others complete silence is necessary to assimilate the material. Emotional elements vary between self-motivated learners, who enjoy learning and achieving, and learners for whom

academic learning in a conventional classroom is not fulfilling. Sociological elements of learning style determine how students react to working alone, with an authority, in a pair, on a small or large team or group, or in other varied circumstances. The physical elements of learning style govern the reception and production of language. Some students feel that they need to have something to eat or drink while they are taking in new and difficult information; others cannot learn while eating or drinking. Some learners prefer learning new and difficult material early in the morning; others are stronger in the afternoon, evening, or late at night (pp: 327-332).

Hoerr (2002) focused on the benefits and details of using multiple intelligences in learning a skill or concept. He presents implications for learning styles in classroom environment and ways in understanding the learning style of a child. He takes a look at a kindergarten class investigating trees and plants. In this class you may see children engaged in a variety of apparently unrelated activities. Children that are used in this research are successfully absorbing information about trees and plants in different ways. While one of them grasps information best when he becomes physically involved in the process, another needs to touch and feel things to truly understand them.

Schroeder (1993) worked on new students- students that have been entering higher institutions for the past 15 years- and their new learning styles. Students are changing dramatically, and we need to respond to those changes. Schroeder and his colleagues obtained a variety of information on approximately 4,000 new students entering their university by administering MBTI, a widely used instrument based on Jungian theory. According to the results students differed with the previous ones.

The results indicate that approximately 60 percent of entering students prefer the sensing mode of perceiving compared to 40 percent who prefer the intuitive mode. The students who prefer sensing learning patterns prefer the concrete, the practical, and the immediate. These students often lack confidence in their intellectual abilities and are uncomfortable with abstract ideas. In contrast, intuitive learners are "big picture" types, who prefer to focus their perceptions on imaginative possibilities rather than on concrete realities. There was a mismatch between the faculty and the students and between the teacher and learning. Unfortunately, the natural differences in learning patterns exhibited by new students were often interpreted by faculty as deficiency. What may be happening, then, is a fundamental mismatch between the preferred styles of faculty and those of students. MBTI data collected over the years on faculty of numerous campuses reveal that over 75% of faculties prefer the intuitive learning pattern. However, Schroeder (1993) suggests an overall understanding of how students learn and where they are in the process. Engaging in such a process will clearly indicate that there are many paths to excellence; and perhaps the greatest contributions that can be made to student learning is recognizing and affirming the paths that are different from one's own.

In his study, Henke (2001) aimed to describe how an aspect of learning theory, specifically learning styles, can be applied to the development of computer based training. He attempted to answer the question whether learning styles, as defined and measured by Kolb's Learning Style Inventory, be applied to the development of computer-based training. Since computer-based training is a fast growing field, he chose this framework as a variable, instead of traditional coursework. He analyzed the issue with the results that he gathered from various articles and made some

conclusions. For example, he discovered that some studies about Kolb's Learning Style Inventory-1976 (KLSI) indicate that there is low test-retest reliability whereas some others show that there is little or no correlation between factors that should correlate with the classification of learning styles. According to the results, most computer-based training is designed to be completed in a short time span. In another article, it is stated that Computer Assisted Learning (CAL) is being widely used because CAL can be adjusted to each learner's style and learner's overcome their learning weaknesses. It is maintained that students learn in a variety of methods but that each student has a preferred learning style. And as such, good course design must be developed to be flexible enough to meet each student's preferred learning style. Henke (2001) has some recommendations for applying Learning Style Theory to the design and development of Computer Based Training such as conducting more research, especially by academics, on how Learning Style Theory can be applied to course development as an off-shoot Computer Based Training development; including elements of learning that match learning styles into course design and development; including elements of related learning style theories such as Dunn's visual, auditory, kinesthetic, and tactual; and designing the course for the learner with their learning styles in mind.

Another interesting study was conducted by Felder and Henriques (1995) on learning and teaching styles in foreign and second language education. Their study defined the individual's learning styles which an individual characteristically acquires, retains, and retrieves information. Moreover, several dimensions of learning style thought to be particularly relevant to foreign and second language education were presented. They outlined ways in which certain learning styles were

favored by the teaching styles of most language instructors and suggested steps to address the educational needs of all students in foreign language classes.

Haar, Hall, Schoepp, and Smith (2002) worked on a project that consisted of interviewing and observing eight teachers employed in K-12 public school systems. They selected the teachers based on reputation as excellent teachers. They were interested in what teachers know about learning styles, how that knowledge is reflected in their classroom practice, and how teachers think and speak about learning. After visiting with teachers, observing their classrooms, and analyzing what they shared with them, they determined three main themes about how they teach to students with different learning styles- (1) how teachers talk about their students' different learning styles, (2) how teachers respond to their students' different learning styles, and (3) why teachers respond to their students' different learning styles. For the first theme, several teachers identified specific terminology while some drew from real life examples when describing how some students simply learn better in different contexts. In some cases, teachers described students in terms of what learning styles their students did not possess. It was important for them to consider whether a student was doing well in relation to how s/he learned best. Teachers who described visual learners were accustomed to writing directions on the board and relying on the written word to guide student learning. Teachers who described auditory learners could recall specific students who do best when listening and make frequent eye contact. For the second theme, teachers used quizzes and examinations as a part of their assessment, but they also relied on informal types of evaluation. They were continually watching, asking, and getting to know their students on a personal level as well as on a learning level to see how well their

students were mastering a presented goal or objective. Teachers sought to teach in a manner that assisted students in gaining a deeper understanding of the content presented. Learning-style teachers taught different children differently, unlike traditional teachers who teach an entire class in the same way with the same methods. For the third theme, teachers took responsibility for the learning of their students in their classrooms and purposefully sought out the best ways to teach them. They identified individual styles and worked with students, actively seeking out the best ways to connect with them rather than using their own dominant learning style. They worked hard to provide the best learning environment.

Lefkowitz (2002) compared the effect(s) of using the Contract Activity Package (CAP) versus traditional instructional methodology on the achievement and attitude-test scores of college students enrolled in courses on medical/legal issues in health care to determine whether specific learning-style traits responded better or less well to a CAP versus to traditional instruction. CAP is an instruction method that requires clearly stated behavioral objectives that begin with a verb (to clarify what must be learned); an analytic and global humorous title to engage global students; multisensory activity and reporting alternatives; multisensory resource alternatives; at least three small group techniques such as brainstorming, case study, circle of knowledge, and/or team learning; multiple-content illustrations; and, options for motivating participants. Traditional Teaching Instruction involves lectures, discussions, and visual resources. The participants for this study were 86 similar health college students enrolled in courses with the content of medical/legal issues of health care in a college of health-related professions, as part of a state university located in an urban setting. The students ranged in age from 20-52, with the majority

between 20-30 years of age. The classes were comprised of diverse ethnic groups. The researcher used the Productivity Environmental Preference Survey (PEPS) which was developed by the Dunn. This reliable and valid instrument was composed of environmental, emotional, sociological, physiological, and cognitive measures. The Semantic Differential Scale (SDS) aimed to measure the students' attitudes toward the different instructional treatments they experienced. Two different Construct Activity Packages (CAPs) were created to present students' auditory, visual, tactual, kinesthetic learning styles so that students could learn through their primary perceptual strength and reinforce content through their secondary strength. At the beginning of the semester, the concept of learning styles and background research was conducted to the four participating classes. The PEPS was administered to the students and their individual profiles were computer-generated. The results indicated that using a CAP was significantly more beneficial for students than instruction using traditional methodology as CAP increased achievement- and attitude-test scores. Moreover, highly-achieving and average students performed better with learning-style responsive rather than dissonant instructional strategies.

Carson and Longhini (2002) worked on a diary study in an immersion setting. The diary study aimed to focus on the second language learning styles and strategies of the diarist/researcher, Joan Carson, in a naturalistic setting, utilizing categories from Oxford's Strategy Inventory for Language Learning and the Style Analysis Survey. The analysis of diary indicated that the learner's learning styles remained relatively constant throughout the language immersion situation, but her strategies were more variable over time. And, the diarist's learning style appeared to influence her use of learning strategies. The diarist/researcher, the first author of this article,

was an applied linguist who taught graduate courses in the Department of Applied Linguistics and English as a Second Language. She was a Spanish false beginner, having taken one semester-long course in Spanish and had spent two weeks in Ecuador, in a Spanish-speaking environment. During the course of this study, Joan went to Argentina as a Fulbright professor to teach linguistics graduate courses in English, and to collaborate with Ana, the second author of this article. For this study, the first author stayed for eight weeks in Argentina and kept a detailed diary of her Spanish learning, focusing almost exclusively on her learning strategies. During that time she did not receive any formal instruction and successfully developed basic conversational skills. She wrote regularly in her diary, except on weekends and days when she away from the city she was staying in. She wrote 32 entries. Ana, the second author, read the diary entries weekly and discussed with Joan. The results indicate some findings in terms of learning style and learning strategies but in this study only the results related to learning styles will be mentioned. Although the results did not show objective measure of Joan's proficiency in Spanish, her diary provides evidence and people with whom she daily conversed gave evidence that her oral communicative abilities at the time she arrived were null and that her comprehension of oral language was very low. However, upon leaving Argentina, her comprehension was good and she could get her needs satisfied and converse informally. In terms of learning styles, Joan's style was visual, introverted, intuitive/random, closure-ended, and global. Joan was aware that she was a visual learner and learned better with visual representation. She was also introverted and this was clear in her diary entries. She was not shy, but was reluctant to interact with unfamiliar people. The following entry shows Joan's being introverted:

> July 29 - A trip to town today. I realized when I finally managed to leave the house about 3:15 that I wasn't exactly looking forward to being on my own for the purpose of communicating with strangers. It felt risky, with a real possibility of failure (2002, p.410).

While learning Spanish, Joan found herself absorbing the language without being aware of how she did this. She was learning the language intuitively. Although she was learning the language naturally, she was conscious of the fact that she was a good language learner and so was comfortable enough with her intuitions. Due to Joan's orientation toward closure, she had successful communications with people with whom she was familiar. And finally, Joan's global style most often surfaced in comprehension, when she was able to suspend various pieces of partly understood language until they formed a larger pattern. To sum up, Joan considered herself a good language learner and she considered herself successful in accomplishing her language learning goals during her stay in Argentina because her learning occurred in a naturalistic environment. If the language was learned in a classroom environment, different findings might be found. Although she simulated classroom behaviors at times (e.g., writing out verbs, reading Spanish books), she did not do these regularly because there were no real consequences (such as grades) (Carson & Longhini, 2002).

Honigsfeld and Dunn (2003) investigated gender differences among the learning styles of 1.637 adolescents from 5 countries – Bermuda, Brunei, Hungary, Sweden, and New Zealand. They aimed to explore if there were significant main effects for gender and nationality, if there were significant interactions between gender and nationality, and if there were significant country-specific differences in learning

styles by gender. The participants attended Grades 7 through 13, depending on the local school system in their country or residence. In every nation except Brunei, they sampled from typical middle-class schools. In Brunei, in which extremely different types of schools exist by government design, an equal number of high- and low-socioeconomic schools were selected. In Bermuda, one private and three government schools were included. In Hungary, New Zealand, and Sweden, public schools were involved. The researchers used the English or appropriate foreign language (Hungarian, Malay, and Swedish) versions of the Learning Style Inventory (ILS) for grades 5-12 identified the learning style preferences of participants in the following subscales: Sound, Light, Temperature, Design, Self-Motivation, Persistence, Responsibility, Structure, Alone/Peers; Authority Figures, Several Ways, Auditory, Visual, Tactual, Kinesthetic, Intake (the need for food or drink); and Morning Versus Evening, Late Morning, Afternoon, Mobility, Parent Motivation, and Teacher Motivation. To investigate whether there would be main effects for gender differences, main effects for country differences, and interaction effects for gender by country, the researchers performed MANOVA. According to the results of the MANOVA, there were significant main effects for gender, with medium effect sizes. On the basis of their findings, researchers concluded that when compared with female students, male students tended to prefer more peer interaction rather than learning alone and more kinesthetic activities. On the other hand, female students on average needed higher temperatures and more self-motivated, parent motivated, and teacher motivated; more persistent; and more responsible or confronting. When adolescents' learning styles were compared by country, significant and more substantial differences emerged for all learning style variables except for auditory

perceptual strength. As a follow-up to the main effect and interaction procedures, the researchers conducted tests of simple main effects for country and gender to identify the differences within the levels of the other variable. Post hoc tests confirmed that there were larger country differences between the two genders than there were gender differences among the five countries. According to the results, male Bermuda students tended to be more tactual, kinesthetic, and peer oriented, whereas female Bermuda students tended to be more self-motivated, teacher motivate, and persistent. Male Brunei students tended to have more energy in the late morning, whereas female Brunei students tended to be more parent motivated and auditory, preferred more variety, and felt more energetic in the afternoon. Male Hungarian students needed more background sound, whereas female Hungarian students were more self-motivated, teacher motivated, persistent, responsible, and authority-figure oriented. Male New Zealand students preferred kinesthetic experiences whereas female New Zealand students needed brighter illumination, preferred warmer temperatures, were more responsible, and enjoyed learning through a variety of ways more than their male counterparts. Finally, male Swedish students were more kinesthetic, whereas female Swedish students tended to be more self-motivated and responsible. When overall results are analyzed, male students were more kinesthetic and peer oriented than female students. And, female students were more self-motivated, persistent, comfortable and needed warmer temperatures, parent and teacher motivation.

Friedman and Alley (1984) used some cases that illustrated a variety of ways learning style theory has been utilized in educational settings. These cases also illustrated effective implementation of the principles implied in the research, and the

variety of applications demonstrated the usefulness of the learning style process. The researchers of this study worked on five cases which represented individual teachers, special programs, and entire districts in the Wichita, Kansas area. Each case relied on the Project CITE Student Learning Style Instrument. This instrument was a simplified styles instrument developed with the Dunn and intended to identify student style preferences in a quick and simple way. The instrument was formed of nine dimensions: auditory linguistic (prefers to learn by means of the spoken word), visual linguistic (prefers to see words in books, charts, or graphs), auditory numerical (prefers to hear numbers and oral explanations), visual numerical (prefers to see numbers on the board, in the book), audio-visual-kinesthetic combination (prefers this combination to learn), individual learner (works best alone), group learner (works best with others), oral expressive (prefers to share knowledge by telling others) and written expressive (prefers to share knowledge by writing). The cases were illustrated as the following:

Case No. 1 – Individual Teacher: A junior high school teacher from Wichita, Kansas administered the CITE Student Learning Style Instrument in the direction of a consultant. After the students scored the instrument, they developed their profiles and shared the results with the class. With this study students were encouraged to contribute to class organization. Because of student enthusiasm, parents were also interested in this study and after explaining the learning styles concept, the teacher administered the survey to the parents and helped them interpret the results regarding their own preferences. The results were positive. In the planning of learning procedures, teacher-student collaboration increased, the parent-teacher conferences became increasingly effective and mutually appreciated.

Case No. 2 – School-Wide Individualized Program: In 1974 an elementary school in Wichita adopted the Individually Guided Education (IGE) program as their basic instructional process. IGE was a schooling approach that provided a framework for individualized instruction and continuous progress. The aim was to create a learning community where students of several years' age-range and teachers of varying talents and backgrounds come together. To achieve this approach, first of all, students' learning styles were identified. The teachers of the school decided that the locally developed learning styles inventory might give them usable and practical information for the students. They put student data from the instrument onto a computer program and a profile for each student was developed and the results were used in determining the best way for each student to reach his/her learning objectives. The results indicated that this study increased student achievement and parental satisfaction.

Case No. 3 – School within a School: The Experience Based Career Education Program at Wichita High School worked on a special program that provided selected students an opportunity to participate in a less formalized learning environment and more effectively meets the needs of certain students. After appropriate planning, to identify the learning styles of the students, the staff of the program included a learning preference assessment, the Student Learning Styles Instrument, which was administered to the students who applied for the program. The positive outcomes of the program and student successes indicated that the assessment of learning modalities helped the program more completely meet the needs of the students through a closer match of work experience and learning style preferences.

Case No. 4 – Alternative School: This school was a kind of alternative learning center for Wichita youth who were drug abusers, school dropouts, family dropouts, and all had discipline problems in school. First of all, the students' learning style preferences were determined. Then, the information was used to develop individual learning programs.

Case No. 5 –District-Wide: A rural district near Wichita decided to support the concept by experimenting with learning styles through an expanded application of the process on a district-wide basis. The district administered the student learning styles survey to every student in the district. The aim was to confirm the effectiveness of existing classroom management techniques and teaching strategies. The results were satisfying and school officials reported increased student learning, improved self concept, and better communication with the district.

Studies in Turkey: Considering the studies conducted abroad, the number of the studies related with learning styles is fewer, but they have been increasing especially on language studies. Çekiç (1991) is one of the researchers who worked on this issue because he believed that studies that were conducted in the USA on individual differences in general, and on learning style in particular, were not applicable in the Turkish Educational System. Taking into account the increasing interest rate in our country, he thought that similar studies done in Turkey would be beneficial to practicing teachers of English language. In his study that was implemented at the Anadolu University English prep classes in Eskişehir, the relationship between academic achievement of Turkish English Foreign Language (EFL) learners and their similarities in perceptual learning style preferences with the teaching styles of their teachers was investigated. Sixty English language learners from a total of 300

students at the prep-classes of Anadolu University were chosen as the subject of this research. The subjects were in two classes –an elementary level class and an intermediate level class. When administering the pre and posttest, the subjects were not asked whether they would like to volunteer to take tests. However, they were notified about the tests by their teachers a week before the tests were given. Teachers' and learners' perceptual teaching/learning style preferences were identified by means of questionnaires, and learners' achievement in reading and grammar courses was measured by administering a standardized test. After that it was examined whether style similarities of teachers and students affected the students' academic achievement. According to the results kinesthetic learning was the most preferred, whereas auditory learning style was the least preferred one. Though the general tendency was toward kinesthetic learning, individual subjects differed in their preferences for particular learning styles. Some students with kinesthetic style preference needed also to do 'hands-on work', whereas some other kinesthetically oriented ones needed oral input. On the other hand, for the students who preferred auditory learning, visual aids and manipulative tasks were not necessary. Likewise, visual learners did not need bodily experiences in language learning. In addition, the research revealed that Turkish female language learners at the universities seemed more visually oriented than Turkish male learners.

Dizdar (1993) selected 152 intensive English preparatory school students from a population of 1180 prep students by means of a stratified random selection for her research study. The study was descriptive in the sense that it described the LSP of learners. It was also an analytic-deductive study which hypothesized there was a significant difference between the LSP of graduates and undergraduates. At Istanbul

Technical University (ITU), where she worked as a prep school teacher, prep school students were separated into two groups as graduates (G) and undergraduates (UG). The main purpose of this study was to discover the learning style preferences (LSP) of EFL students in of the G and UG in ITU prep classes and find out if there was a relationship between success on tests and LSP of the students. Then, she wanted to discover whether the tests were beneficial only for certain individuals because they always tended to do better on tests. The first hypothesis of the study was that graduate and undergraduate students have significantly different LSP. This hypothesis was not supported. The second hypothesis expected that there was no relationship between LSP and success in tests. This hypothesis was supported. Dizdar (1993) pointed out that all universities except ITU instructed their G and UG students in the same classes in their intensive English preparatory schools in Turkey. The results of this study showed that there was no need to design separate programs, curriculum and syllabus to account for each group's LSP. Such a separation may be done for other reasons, such as face value, but not LSP. The descriptive analysis of the questionnaire items used in the study showed that students preferred to learn English through a variety of activities and learning styles because most learners were multiple-style learners. This means that students needed multiple ways to be able to acquire knowledge. Students also had different expectations from the teacher. First of all, the students wanted their teachers to explain everything to them. They wanted teachers to tell them their mistakes, too.

Akgün (2002) investigated the learning styles of English learners at private English courses. She aimed to discover whether age, gender and education level influence the learner's learning style preference. Descriptive method was used in

this study. In her study, 350 randomly selected English learners and 47 teachers were involved. 47% of the learners were women and 53% of them were men. In terms of age range, 12% of the learners were 18-20, 35% of them were 21-24, 43% of them were 25-34, 10% of them were 35 and older participants. The study took place in Ankara and six private English courses were included. In order to collect data, the researcher used an instrument developed by Willing (1988) for applying on the Australian immigrants to teach English. This instrument was translated into Turkish by educational expert and Cronbach Alpha (.87) indicates that the Turkish version of the questionnaire was appropriate to use this instrument. The learner questionnaire consisted of two parts: the first part asked for personal information such as age, gender and level of education and the second part included 28 items that have been applied by means of Likert Scale. Likert Scale, a commonly used attitude scale in educational research, discovers attitudes by asking individuals to respond to a series of statements of preference. If individuals agree with statement, it is inferred that these students have a positive attitude toward such a statement. On some items, 5 (strongly agree) will indicate a positive attitude, and be scored 5. On other items, a 1 (strongly disagree) will indicate a positive attitude and be scored 5 (Fraenkel & Wallen, 2003). Apart from this learner instrument, another 20-item questionnaire for teachers was conducted by taking the first 20 items of the second part of the learner questionnaire. The results related to age, gender and level of education were calculated by means of Cronbach Alpha (.05). The Kruskal-Wallis one-way analysis of variance was used to compare the variables-age, gender and level of education. By means of the Kruskal-Wallis one-way analysis of variance, the scores of the participants in the several groups are pooled and then pooled and then ranked as if

they come from one group. The sums of the ranks added together for each of the separate groups are then compared. In case of differently summed ranks, the Mann-Whitney *U* Test, a nonparametric alternative to the *t*-test used when a researcher wishes to rank analyzed data was used (Fraenkel & Wallen, 2003). The results indicated that the most preferred learning style among learners was concrete learning style, and in order the others were communicative, authority-oriented and analytical learning styles. Among teachers the same order of learning styles was inferred. The results related to age and gender did not indicate any difference in relation to learning styles. In other words, participants' learning styles did not differ according to their age and gender. However, in terms of level of education, there was a significant difference between university graduates and M.A. students and other learners because university graduates and M.A. students preferred analytical learning style more than the other learners.

Arslan (2003) aimed to assess learning style preferences of the students in engineering departments at Middle East Technical University (METU). She claimed that awareness of the learning style could help instructors to be more sensitive toward the individual differences in class and learning styles affected both the classroom interaction and the success of the students in class. Her study was considered to be beneficial to find out the preferred learning style of engineering students. She also aimed to find out whether students' learning style preferences differ according to department, sex and CGPA scores. Results were analyzed according to Felder and Silverman's (1988) four dimensions of learning style – process dimension (active and reflective learning), perception dimension (sensing and intuitive learning), input dimension (visual and verbal learning) and

understanding dimension (sequential and global learning). In her study, her subjects were randomly selected 400 students out of 1447 senior engineering students. In this study, ILS (a 44-item pencil-and-paper questionnaire) designed by Felder and Silverman was employed to discover the learning styles of the students. To calculate the mean scores of the students, sub-dimensions were coded as 1 and 2, and the scores related to active, sensing, visual, and sequential learning preferences varied between 11-16 and scores related to reflective, intuitive, verbal, and global learning preferences varied between 17-22. The researcher used Chi-Square for department and sex related questions and *t* test for CGPA. Results of the study indicated that engineering students, both male and female, were dominantly active learners and heavily sensing learners rather than intuitive. Considering input dimension all engineering students indicated their preferences toward visual learning. The main conclusion drawn from the last dimension was that there was not any significant difference between sex, department, CGPA and four learning style dimension. In conclusion, study revealed that learning style preferences of the engineering students were not different from each other depending on department variable. Male and female students' learning style preferences and CGPA scores were not significantly different from each other.

CHAPTER 3

METHOD

In this chapter the overall design of the study, description of the subjects of the study, data collection instrument, pilot study of the data collection instrument, data collection procedure, data analysis techniques, and the limitations of the study are presented.

3.1 Overall Design of the Study

The overall design of this research study is survey. Fraenkel and Wallen describe survey as follows: 'Survey is an attempt to obtain data from members of a population (or a sample) to determine the current status of that population with respect to one or more variables' (2003, p.G-8).

Surveys possess three major characteristics. First of all, the major purpose of surveys is to describe the characteristics of a population (such as abilities, opinions, attitudes, beliefs and/or knowledge). Researchers are also targeted in participants' age, gender, ethnicity, and so on. Second, the main way in which the information is collected is through asking questions; the answers to these questions by the members of the group constitute the data of the study. And third, information is collected from a sample rather than from every member of the population (Fraenkel & Wallen, 2003).

There are two major types of surveys that can be conducted – cross-sectional survey and a longitudinal survey. In a longitudinal survey, information is collected

at different points in time in order to study changes over time. However, this research study is a cross-sectional survey in which information is collected at one point in time (Fraenkel & Wallen, 2003).

There are four basic ways to collect data in a survey: individual interview, group interview, telephone interview, and questionnaire (Krathwohl, 1998; Fraenkel & Wallen, 2003). In this research study, the researcher administered the questionnaire directly to the participants of the study who were 367 preparatory school students at Gazi University, in Ankara. In other words, randomly selected students were given a questionnaire, Index of Learning Styles (ILS) developed by Felder and Soloman, to complete in their classrooms at the same time and in the same place. The purpose of ILS was to determine students' learning style preferences. The main advantage of administering such a questionnaire to such a group was the high rate of return and the questionnaire's low expense (Fraenkel & Wallen, 2003). Then, the participants' achievement scores obtained from four of their English mid-terms were written down. The aim was to find out whether there was any relationship between students' LSP in relation to faculty they will study in, gender, and level of English and achievement scores on listening, reading, grammar, and writing in the English course. This research study made use of SPSS for Windows for the data analysis – ILS, students' learning styles, means, percentages, and Crosstabs (Green, Salkind & Akey, 2000).

3.2 Participants

The participants of the study were 367 preparatory school students out of 1633 preparatory school students at Gazi University in Ankara. While determining the subjects of the research study, two steps were followed. Students at Gazi University Preparatory School are gathered in groups of 22-25 classes and each class has one main English instructor. Thus, first of all, the researcher listed the names of the English instructors who had closer relationship with her and had a meeting with each of those instructors. The instructors who accepted to help to the researcher administered the questionnaires to the students that were randomly selected from among the classes of those instructors. The randomly selected students were good representatives of the whole group, Gazi University Preparatory School students. Participants were from different English proficiency levels (EPL) – beginner (D), elementary (C), intermediate (B), and upper-intermediate (A).

Table 1

Distribution of Participants According to Level

Level	Population	Participants	Male		Female		Total
			n	*(%)*	*n*	*(%)*	*(%)*
Beginner	811	157	107	68.2%	50	31.8%	42.8%
Elementary	417	104	69	66.4%	35	33.6%	28.3%
Intermediate	264	63	34	54%	29	46%	17.2%
Up-Intermediate	141	43	10	23.3%	33	76.7%	11.7%
Total	1633	367	220	59.9%	147	40.1%	100%

The ILS instrument was administered to 420 prep students and 367 forms were returned. Table 3.1 shows the distribution of participants according to their levels of English and their gender. Out of 367 participants, beginner level students constitute the largest group of participants (42.8%). 28.3% of them were elementary level, 17.2% were intermediate level and 11.7% of them were upper intermediate level students. In comparison with female students (40.1%), the number of male students is bigger (59.9%). The number of beginner, elementary and intermediate male students is greater than female students whereas the number of upper intermediate male students is lower than females.

B, C, D Level students were from three different faculties – Engineering, Administrative Sciences, and Medicine – and A level students were all from Faculty of Education, Department of English Language Teaching (ELT) (Table 2).

Table 2

Distribution of Participants According to Faculty

Faculty	*n*	Male *n*	Female *n*	*P (%)*
Education	45	11	34	12.3%
Engineering	128	90	37	34.7%
Administrative Sciences	171	102	69	46.7%
Medicine	23	16	7	6.3%
Total	366	219	147	100%

3.3 Description of Variables

For the second research question and its sub-questions the independent variables were the four learning style dimensions (active/reflective; sensing/intuitive; visual/verbal; sequential/global) and the dependent and continuous variables were the achievement scores (listening, reading, grammar and writing). For the 3rd, 4th and 5th questions the faculty, gender and level were the independent variables and the learning styles were dependent variables.

3.4 Data Collection Instrument

In this research study, the Index of Learning Styles (ILS) developed by Felder and Soloman was used.

3.4.1 Index of Learning Styles (ILS)

In this research study, the Index of Learning Styles (ILS) developed by Felder and Soloman is an instrument used to assess preferences on four (process, perception, input, and understanding) of the five Felder-Silverman dimensions of a learning style model formulated by Felder and Silverman in 1987. ILS classifies students as *active* (extravert, learn in groups, discuss and do it first, experimentalists) or *reflective* (introvert, learn by working alone, think it first, theoreticians); *sensing* (concrete, practical, oriented toward facts and procedures) or *intuitive* (conceptual, innovative, oriented toward theories and meanings); *visual* (the ones that prefer pictures, diagrams, flow charts) or *verbal* (prefer written and spoken explanations); *sequential* (linear, orderly, step by step) or *global* (holistic, learn in large leaps, system thinkers) (Felder, 1988, 1996, 2002; Felder and Henriques, 1995).

A preliminary version of the ILS which included 28 items was tested, the responses were subjected to factor analysis, and some of the items that were not providing noticeable discrimination were replaced. Later, Felder and Soloman developed 44-item version of the instrument (Felder, 2002). Felder (2002) stated that he had to make two significant changes in the model: dropping the inductive/deductive dimension and changing the visual/auditory category into visual/verbal. According to Felder (2002), inductive teaching is the best method for teaching because it is not traditional, monotonous and stereotyped like deductive teaching. However, Felder and Soloman noticed that by means of this deductive/inductive dimension, students clearly express that they prefer exactly what they needed and teachers continue to teach with that proceeding deductive method. Thus, they omitted this dimension from the instrument.

Felder and Soloman also modified visual/auditory category into visual/verbal because visual learning includes pictures, charts, diagrams, etc. and auditory learning includes words and other sounds. However, auditory learning does not include written words. It perceived visually, but cannot be auditory. Making the learning style pair visual/verbal solves the problem by permitting spoken and written words to be included in the verbal category (Felder, 2002).

ILS was mainly developed for engineering students, but in this study, it was applied to preparatory school students at Gazi University in Ankara. Index of Learning Styles has both web-based and pencil- and -paper versions. In this research study, the pencil- and –paper version of the instrument was used as it was less expensive and easier to conduct. The aim of the ILS is to help learners to identify their own dominant learning styles (Hong & Kinshuk, 2004). The ILS questionnaire

consists of 44 items that each comes with two possible answers, "*a*" or "*b*". "*a*" Responses represent active, sensing, visual, and sequential learners whereas "*b*" responses represent reflective, intuitive, verbal, and global ones (Felder and Silverman, 1988) (Table 3).

Table 3

Distribution of ILS Items According to Dimension

Dimension	Sub-dimension	Related Items
Process	Active	1a 5a 9a 13a 17a 21a 25a 29a 33a 37a 41a
	Reflective	1b 5b 9b 13b 17b 21b 25b 29b 33b 37b 41b
Perception	Sensing	2a 6a 10a 14a 18a 22a 26a 30a 34a 38a 42a
	Intuitive	2b 6b 10b 14b 18b 22b 26b 30b 34b 38b 42b
Input	Visual	3a 7a 11a 15a 19a 23a 27a 31a 35a 39a 43a
	Verbal	3b 7b 11b 15b 19b 23b 27b 31b 35b 39b 43b
Understanding	Sequential	4a 8a 12a 16a 20a 24a 28a 32a 36a 40a 44a
	Global	4b 8b 12b 16b 20b 24b 28b 32b 36b 40b 44b

In order to find the dominant learning style of learners, the mean scores of each dimension were found by summing total scale scores. "*a*" Responses were coded as a 1 and "*b*" responses were coded as a 2. Then, for each of the four scales, the smaller total was subtracted from the larger one. The mean scores range from 11 to 22, and 1-16 for active / sensing / visual / sequential and 17-22 for reflective / intuitive / verbal / global (Smalley, 2002).

Eleven questions form the basis for determining each learning dimension. For example, if under Active/Reflective, the learner had 2 *a* and 9 *b* responses, the dominant learning style is 7*b* (9*b*-2*a* = 7*b*). That means the learner is a reflective learner (Felder & Soloman, 1998). For each dimension, if learner's score on a scale is 1-3, s/he has a mild preference for the one or other dimension. If the learner's score on a scale is 5-7, s/he has a moderate preference for one dimension of the scale and will learn more easily in a teaching environment which favors that dimension. If the score on a scale is 9-11, s/he has a strong preference for one dimension of the scale and may have difficulty learning in an environment which does not support that preference (Felder & Soloman, 1998).

As the English proficiency levels of the preparatory school students at Gazi University were not the same and the students from lower levels would not be able to respond the English ILS, the Turkish version of the questionnaire was used. The Turkish version of the ILS is the translated version of the original instrument (adapted from Öztürk, 2003). The Turkish version was already formed under the supervision of educational experts. In December 2003, the ILS was given to two experts, an assistant professor and a professor, who were actively working at METU, Department of Educational Sciences and Department of Foreign Language Education. Each expert was given the data collection instrument and was asked to evaluate the items in terms of Turkish translation. After it was found appropriate to conduct, the instrument was piloted with upper-intermediate students at Department of Basic English, METU; details are explained under pilot study.

The ILS instrument was used in this study because it was appropriate for university students. This instrument was designed for engineering students, but as it

was also used in researches for students from various departments and the questions were not limited only to engineering students, the ILS was used in this study, too. It was easy to administer the ILS because it was available on the Internet. It was time saving, taking only 10-15 minutes to complete and easy to understand. Felder and Soloman (1998) also suggest that the questionnaire takes 15-20 minutes to complete.

Except for the ILS instrument, there are other instruments that help to discover one's LSP. For example, four more instruments, LSI, HBDI, Barsch LSI, and SILL are mentioned.

The Learning Style Inventory (LSI): LSI, developed by the Dunn, is the first comprehensive approach to the assessment of an individual's learning style in grades 5 through 12. This instrument is an important first step toward identifying the conditions under which each person is most likely to concentrate on, learn, and remember new and difficult academic information (Dunn and Dunn, 1993).

Careful analysis of each student's LSI identifies those elements that are crucial to the individual's learning style. Further, the instrument aids in prescribing the type of environment, instructional resources, social groupings, and motivating factors that examine personal achievement. Many of the questions in the instrument are highly subjective and relative. Each student's learning style is based on a complex set of reactions to varied stimuli, feelings, and previously established patterns. Those patterns tend to be repeated when the person concentrates on new or difficult material. Thus, the words think, learn, read, write, and concentrate are used interchangeably throughout the inventory, and it is not necessary for the respondent to differentiate among their meaning (Dunn and Dunn, 1993).

The inventory does not measure underlying psychological factors, value systems, or the quality of attitudes. Rather, it yields information about the patterns through which learning occurs. It summarizes the environmental, emotional, sociological, psychological, and global/analytic processing preferences a student has for learning. Finally, the inventory also gives evidence of how students prefer to learn. This instrument can be completed in approximately 30 or 40 minutes and is reported that LSI had established impressive reliability and face and construct validity (Dunn and Dunn, 1993). The LSI was not used in this research study because it was designed for school grades from 5 to 12.

Herrmann Brain Dominance Instrument (HBDI): HBDI developed by Herrmann in 1979 classifies students in terms of their relative preferences for thinking in four different modes based on task-specialized functioning of the physical brain (Felder, 1996). The four modes or quadrants in this classification scheme are;

- *Quadrant A* (left brain, cerebral). Logical, analytical, quantitive, factual, critical;
- *Quadrant B* (left brain, limbic). Sequential, organized, planned, detailed, structured;
- *Quadrant C* (right brain, limbic). Emotional, interpersonal, sensory, kinesthetic, symbolic;
- *Quadrant D* (right brain, cerebral). Visual, holistic, innovative.

The HBDI is a thinking styles assessment tool which allows a person to learn more about how his/her brain functions and to learn about learning and thinking preferences. The HBDI is adaptable and open to change. This encourages many

people to discover and design a pathway to change (Nasmyth, Schultz & Williams, 2002).

The HBDI is a powerful instrument that improves communication, increases productivity, encourages innovation, enhances performance and assists management. All people have access to four thinking modes. The results of the HBDI Survey form indicate the degree of preference one has for each of the four quadrants. The HBDI is not a test and there are not right or wrong answers, or good or bad profiles (Herrmann, 2004).

The HBDI was not selected for this study because the instrument was designed for adults working in professional occupations and it was recommended primarily to that population. It was not validated with any population of a younger age or lesser education group.

Barsch Learning-Style Inventory (LSI): This instrument aimed at finding out to what degree an individual is a visual, auditory, or tactile/kinesthetic learner. As Davis (1994, cited in Doyran, 2000) suggests *Visual Learners* learn primarily with their eyes. Teachers can use chalkboards, posters, books, magazines, drawings, pictures, films, and computer monitors if available. *Auditory Learners* learn with their ears. Teachers can use lectures, discussions, records, tapes, radio, and television in their courses. The teacher should give precise oral directions and explanations. *Tactile Learners* need to see, hear and do to learn. Teachers should have touchable and movable materials for such students. Students should be able to plan, demonstrate, report, and evaluate by using models and real objects and the teacher should encourage written, graphic, and computer records of information (p.41).

Davis (1994, cited in Doyran, 2000) states that LSI aims to assess one aspect of one's learning style. There are 24 questions and The LSI uses choice of five Likert Scale responses for each of the preferences described: almost never (0), seldom (1), sometimes (2), usually (3), and almost always (4). Items 2, 3, 7, 10, 14, 16, 20, and 22 refer to visual learning. Items 1, 5, 8, 11, 13, 18, 21, and 24 refer to auditory learning. And, items 4, 6, 9, 12, 15, 17, 19, and 23 refer to tactile learning. The Barsch tells one's learning preferences in only one area (p.177).

Although the LSI was specifically designed for English language learners, it was not selected for this study because it was limited to three learning preferences (visual/auditory/tactile). These three preferences are not included under dimensions as well as ILS. ILS describes LSPs in detail under four dimensions - process, perception, input, and understanding - and these dimensions include sub-dimensions. Such distribution was better to determine the learner's learning style preferences in a more confident way, so the ILS was preferred in this study.

Strategy Inventory for Language Learners (SILL): The SILL was developed by Rebecca Oxford (1990, cited in Tunç, 2003). The SILL was designed to assess the frequency of use of language learning strategies. In the questionnaire there are statements that describe language learning strategies. It is a student- completed rating scale which includes 50 items. The SILL uses choice of five Likert Scale responses for each of the strategies described: never or almost never true of me (1), usually not true of me (2), somewhat true of me (3), usually true of me (4), and always or almost always true of me (5) (p.40-43).

As Oxford and Burry-Stock (1995, cited in Tunç, 2003) states, in addition to the original English version, the SILL has been translated into Arabic, Chinese, French,

German, Japanese, Korean, Russian, Spanish, Thai, and Ukrainian. Studies done on reliability and validity of these translated versions indicate that the SILL was reliable and valid instrument to use (p.43).

Tunç (2003) translated the SILL into Turkish to increase the validity of her study in which she used the original version of the instrument because Turkish was the mother tongue of all participants of her study. The reason for using the translated version of the SILL was due to the fact that some of the participants' English language proficiency was not enough. After the Turkish version was piloted, a few examples to some items were included to make them more explicit and comprehensive. The reliability analysis of the Turkish version of the SILL was calculated as .88 (Cronbach's Alpha). The SILL was not used in this study because it aimed to assess the learning strategies of the learners, not learning styles.

3.4.2 Pilot Study

In the pilot study which was carried out in December 2003, the data collection instrument was administered to 132 upper-intermediate students at Department of Basic English, METU and 90 forms of the questionnaire were returned. 6 groups were selected randomly and both the original ILS version and Turkish version were administered. At the first meeting students took the English ILS and the questionnaires were collected back.

At the second meeting, which was two days after the first one, the students took the Turkish ILS. The answers of these 90 students were evaluated and correlated to check match between the English and Turkish versions of the questions.

The results obtained from both Turkish and English versions of ILS were used to compute Pearson correlation between these two versions. The significance of the correlation results (p = .05) indicated that there is a strong correlation between Turkish and English versions of ILS (Table 4).

Table 4

Correlation and Alpha Reliability for Each Dimension

	Alpha Reliability	Pearson Correlation
Active/Reflective (English)	.6648	
Active/Reflective (Turkish)	.6193	.862
Sensing/Intuitive (English)	.7344	
Sensing/Intuitive (Turkish)	.7257	.845
Visual/Verbal (English)	.6925	
Visual/Verbal (Turkish)	.7069	.882
Sequential/Global (English)	.5394	
Sequential/Global (Turkish)	.5300	.771

Moreover, in order to look at the reliability of the items in the Turkish and English versions of the ILS an alpha coefficient (Cronbach alpha) was calculated. The results indicated that the Turkish version of ILS was reliable enough to employ it. There was a high correlation between the dimensions in the Turkish version (Table 4).

3.5 Data Collection Procedures

The ILS instrument was administered to 420 prep students and 367 forms were returned. The ILS forms were given to English instructors at Gazi University and they administered the forms to their students and collected them back.

Apart from the learning style preferences of the students, their achievement scores obtained from 4 mid-terms practised during the Fall Semester (2003-2004) were taken into consideration. Students take 8 mid-terms each academic year at Preparatory School. Each semester students take 4 mid-terms that consist of listening, reading, grammar, vocabulary and writing at Gazi University. To find whether there was any relationship between the students' learning styles and achievement scores, their mid-terms were analyzed according to listening, reading, grammar and writing. After getting the required permissions, the results students received from each mid-term were collected from the records of Gazi University Preparatory School. Listening sections, reading sections, grammar sections, and writing sections of the 1st, 2nd, 3rd, and 4th mid-terms were collected one by one. The results according to each section were collected and summed. For example, student X got 9 listening points from mid-term one and 10 listening points from mid-term 3. The total listening score he got from listening was 19. All the mid-terms (for beginner, elementary, intermediate and upper-intermediate students) contained reading and grammar, but listening and writing sections were not included in each mid-term. Anyway, each level had each skill (listening and writing) measured in a mid-term at least once so it was possible to calculate the scores. The data was collected at the end of the fall semester 2003-2004 and it took nearly three weeks to complete data collection.

3.6 Data Analysis Procedures

The main purpose of this study was to determine the learning styles of preparatory school students coming from different faculties at Gazi University and to examine whether there is a relationship between students' learning style preferences according to faculty they will study, gender, level of English and achievement scores on listening, reading, grammar, and writing in the English Course.

As for the data analysis, in relation to the 1st question, descriptive statistics was used to portray the frequencies, percentages, means and standard deviations. For the 2nd research question and its sub-questions, an independent-samples *t* test was conducted to see whether students' achievement scores differ according to their LSP. For the 3rd, 4th and 5th research questions and their sub-questions, the Crosstabs procedure was conducted to find out whether the LSP of the students at Gazi University differ according to faculty they will study in, gender and proficiency level of English.

3.7 The Limitations of the Study

The study will be limited to Gazi University, so the results may not reflect the situation in whole universities. Also, bipolar characteristics of the questions in the instrument limit the students with two alternatives. The ILS assessment may cause some problems because there are 44 items on the questionnaire which are divided into 11 items according to learning style dimensions -process, perception, input and understanding. Each dimension is composed of two sub-dimensions. Each item has two options, which is called forced-choice. For example, if you choose 6 options in

terms of active learning, you automatically choose 5 for reflective learning. This indicates that only one more option makes you an active learner. But, Felder (1993) warns learners against being over-interpreted. If a learner does not agree with the ILS assessment of his or her preferences, s/he should trust that individual's judgment over the instrument results. Moreover, the learner's learning style profile does not reflect a learner's suitability or unsuitability for particular subject, discipline or profession. If the learner uses this as justification for a major shift in curriculum or career goals, this can be destructive for him/her.

CHAPTER 4

RESULTS

This chapter is devoted to the results of the study. It will mainly focus on the preparatory school students' learning style preferences at Gazi University, the relationship between the achievement scores of the students and their learning style preferences, and whether the students' learning style preferences differ according to the faculty, gender and level of English. After a short description of the characteristics of the participants, findings will be presented in the same sequence with the research questions.

4.1 Characteristics of the Participants

In the study 367 Gazi University Preparatory School students were involved. Among 367 students involved in the study with 1 missing, 12.3% (n = 45) of them were from Faculty of Education, 34.6% (n = 127) of them were from Faculty of Engineering, 46.6% (n = 171) of them were from Faculty of Administration, and 6.3% (n = 23) of them were from Faculty of Medicine. In terms of level of English, among 367 students, 42.8% (n = 157) of the students were beginners, 28.3% (n = 104) of them were elementary level, 17.2% (n = 63), of them were intermediate level, and 11.7% (n = 43) of them were upper intermediate level. In terms of gender, 59.9% (n = 220) of the students were male, and 40.1% (n = 147) of the students were female. The age range of the students was from 16 to 25 (n = 365) with a mean of 18.88 (SD = 1.09).

4.2 Results

In this study four research questions were asked regarding the LSP of preparatory school students at Gazi University. The results will be presented in the same sequence with the research questions posed for the study.

4.2.1 Learning Style Preferences

The first question was set as 'What are the learning style preferences of the students at Gazi University Preparatory School?'

In order to find out the answer to this question, Felder's Index of Learning Styles (ILS) was applied to the students. The ILS assesses preferences on four dimensions: process (active vs. reflective), perception (sensing vs. intuitive), input (visual vs. verbal), and understanding (sequential vs. global). The scales consist of 44 items. There are 11 items for each dimension. Each item has two options *a* and *b* and *a* represents active, sensing, visual, sequential learners whereas *b* represents reflective, intuitive, verbal, and global ones (Felder & Silverman, 1988). In order to find out the mean scores for each of these four learning style dimensions, *a* responses were coded as a 1 and *b* responses were coded as a 2. Total scores were found for each of the learning style dimensions. The mean scores that range from 11 to 16 represent active, sensing, visual, sequential learners and the mean scores that range from 17 to 22 represent reflective, intuitive, verbal, and global learners for each dimension (process, perception, input and understanding).

Descriptive statistics was used to portray the frequencies, percentages, means and standard deviations of the variables. Descriptive analyses indicated that in terms of process, among the 367 students involved in the study, 50.1% (n = 184) of the

students were active learners and with a slight difference 49.9% (n = 183) of them were reflective learners. In terms of perception, 77.4% (n = 284) of them were sensing and 22.3% (n = 82) of them were intuitive learners. In terms of input, 84.7% (n = 311) of them were visual learners and only 14.2% (n = 52) of them were verbal learners. Finally, in terms of understanding, 45.8% (n = 168) of them were sequential and 54.2% (n = 199) of them were global learners.

Table 5

Learning Style Preferences of the Students

Dimension	Sub-dimension	*n*	*P*	*M*	*SD*
Process	Active	184	50.1%	1.5	.50
	Reflective	183	49.9%		
Perception	Sensing	284	77.4%	1.22	.41
	Intuitive	82	22.3%		
Input	Visual	311	84.7%	1.14	.35
	Verbal	52	14.2%		
Understanding	Sequential	168	45.8%	1.54	.5
	Global	199	54.2%		

According to these results, in terms of perception, input, and understanding most of the students were sensing, visual, and global learners whereas in terms of process students were both active and reflective.

Students' being sensing, visual and global is not surprising because most people and presumably most students prefer facts, procedures, visual representations and

freedom while learning. It is interesting that students are equally active and reflective. It is claimed that most lectures are reflective based on passive roles, listening to and observing the instructor and taking notes (Kolb, 1984). Although the students complain about such lectures, they are not mainly active in this case.

4.2.2 Achievement and Learning Style Preferences

The second question was stated as 'Do students' achievement scores differ according to their LSP?' In order to answer this question, four sub-questions were formulated. The results were reported in terms of listening, reading, grammar and writing taking into consideration the four dimensions of learning styles.

An independent-samples *t* test was conducted for each of four dimensions to evaluate whether students' achievement scores differ according to their LSPs. According to the results obtained form the collected data, students' achievement scores did not show any significant difference in terms of their LSPs. Four dimensions, process (active vs. reflective), perception (sensing vs. intuitive), input (visual vs. verbal) and understanding (sequential vs. global), were analyzed one by one.

In terms of Process Dimension (Active vs. Reflective), an independent samples *t* test was conducted to evaluate whether students English achievement scores differ according to being active or reflective learners. The *t* test was not significant, $t(364.81) = .17$, $p > .05$. The active learners' achievement scores ($M = 207.15$, $SD = 52.71$) and reflective learners' achievement scores ($M = 206.23$, $SD = 51.26$) do not differ. In other words, being active or reflective does not influence students' overall achievement.

In terms of Perception Dimension (Sensing vs. Intuitive), an independent samples *t* test was conducted to evaluate whether students English achievement scores differ according to being sensing or intuitive learners. The *t* test was not significant, *t* (139.18) = 1.5, $p > .05$. That is sensing learners' achievement scores (M = 209.27, SD = 51.67) do not differ from those of intuitive learners (M = 200.09, SD = 48.24). That is, being sensing or intuitive does not influence students' overall achievement.

In terms of Input Dimension (Visual vs. Verbal), an independent samples *t* test was conducted to evaluate whether students English achievement scores differ according to being visual or verbal learners. The *t* test was not significant, *t* (71.09) = 1.47, $p > .05$. That is visual learners' achievement scores (M = 208.69, SD = 51.33) do not differ from those of verbal learners (M = 197.87, SD = 48.94).

In terms of Understanding Dimension (Sequential vs. Global) an independent samples *t* test was conducted to evaluate whether students English achievement scores differ according to being sequential or global learners. The *t* test was not significant *t* (330) = -1.68, $p > .05$. That is sequential learners' achievement scores (M = 201.68, SD = 56.12) do not differ from those of global learners' achievement scores (M = 210.91, SD = 47.84). In other words, being sequential or global does not influence students' overall achievement.

4.2.2.1 Listening Scores and Students' Learning Style Preferences

The first sub-question of the second research question of this study aimed to test whether listening scores of the students differ according to their LSPs. *t*-Test results revealed that there was no statistically significant difference in students' listening scores according to their LSPs. Results are summarized in Table 6.

Table 6

Listening Scores & Learning Style Preferences of the Students

Dimension	*n*	*M*	*SD*	*df*	*t*	*p*
Active	184	20.36	9.06	363.82	-.09	.93
Reflective	183	20.45	9.54			
Sensing	284	20.77	9.34	137.13	1.24	.22
Intuitive	82	19.38	8.87			
Visual	311	20.74	9.21	68.05	1.45	.15
Verbal	52	18.69	9.49			
Sequential	168	19.71	9.49	349.52	-1.30	.19
Global	199	20.98	9.11			

Although the results indicated that being active or reflective, sensing or intuitive, visual or verbal and sequential or global learner did not increase the success in listening, instructors can liven up their courses by organizing various activities that address to majority of the students. For example, discussion groups that will engage all the students, not just the small minority who typically participate in class, can be organized. Such activities can relieve the monotony of continuous lectures and increase the achievement scores on listening of students. Besides, instructors can reach the verbal learners that have better listening skills and possess the ability to catch subtle nuances in words, tone, inflection and overall meaning with such activities (Felder & Henriques, 1995).

4.2.2.2 Reading Scores and Students' Learning Style Preferences

The second sub-question of the second research question of this study aimed to test whether reading scores of the students differ according to their LSPs.

Table 7

Reading Scores & Learning Style Preferences of the Students

Dimension	*n*	*M*	*SD*	*df*	*t*	*p*
Active	184	58.97	16.30	364.29	-.31	.76
Reflective	183	59.49	15.52			
Sensing	284	60.06	15.8	138.58	1.58	.12
Intuitive	82	57.07	14.82			
Visual	311	59.88	15.55	68.27	1.49	.14
Verbal	52	56.33	15.93			
Sequential	168	57.55	17.16	330.07	-1.83	.07
Global	199	60.64	14.64			

t-Test results revealed that there was no statistically significant difference in students' reading scores according to their LSPs. Results are summarized in Table 7.

Results indicated that students' reading scores did not differ according to their LSPs. However, as studies claim integrating written texts with visual presentations can increase the students' understanding in English and accordingly their achievement and as most students are visual learners, this fact might influence their achievement scores (Felder & Henriques, 1995).

4.2.2.3 Grammar Scores and Students' Learning Style Preferences

The third sub-question of the second research question of this study aimed to test whether grammar scores of the students differ according to their LSPs. As shown in Table 8, there was no significant difference between the students' LSPs and their grammar scores.

As students have different learning styles, they learn different subjects in different ways. While some of them like to read literal texts (sensors), others prefer to deal with grammatical structure in English courses (sequential learners). According to Felder and Silverman (1988), instructors should teach grammar in the context of situations to which students can relate in terms of their personal and career experiences and especially intuitive and global can succeed in such cases.

Table 8

Grammar Scores & Learning Style Preferences of the Students

Dimension	*n*	*M*	*SD*	*df*	*t*	*p*
Active	184	116.15	27.18	364.98	.51	.61
Reflective	183	114.71	26.83			
Sensing	284	116.46	26.67	134.84	1.03	.30
Intuitive	82	113.09	25.84			
Visual	311	116.20	26.7	70.52	.97	.34
Verbal	52	112.44	25.80			
Sequential	168	113.12	28.86	334.29	-1.49	.14
Global	199	117.38	25.19			

4.2.2.4 Writing Scores and Students' Learning Style Preferences

The fourth sub-question of the second research question of this study aimed to test whether writing scores of the students differ according to their LSPs.

As shown in Table 9, there was no significant difference between the students' LSPs and their writing scores. To sum up, not all students may like the writing skill because sitting at the desk and writing can be boring especially for active learners who need to interact with others, but the instructors can give the option of cooperating on at least some homework assignments. At Gazi University, the writing skill is measured in a similar way with grammar, so it is not surprising that LSPs did not influence the achievement scores of students. Maybe students can be

given the opportunity to use their creativity while writing in the mid-terms. Moreover, the testers can avoid emphasizing only grammar in testing.

Table 9

Writing Scores & Learning Style Preferences of the Students

Dimension	*n*	*M*	*SD*	*df*	*t*	*p*
Active	184	11.67	6.95	364.99	.12	.90
Reflective	183	11.58	6.87			
Sensing	284	11.98	7.02	144.46	1.77	.08
Intuitive	82	10.55	6.29			
Visual	311	11.87	7	78.05	1.63	.11
Verbal	52	10.40	5.80			
Sequential	168	11.29	7.06	349.27	-.86	.39
Global	199	11.91	6.77			

4.2.3 Faculty and Learning Style Preferences

The third research question was stated as 'Do the LSP of the students differ according to faculty they will study in?' In order to answer this question, four sub-questions were formulated. The results were reported according to the four dimensions and their relationship with the faculties students were admitted in. The Crosstabs procedure was used to find out the LSPs of the students at Gazi University according to faculty they will study in. Results were examined for each dimension separately and reported in the following paragraphs.

In terms of process dimension, 51.1% (n = 23) of the students from Faculty of Education and 54.8% (n = 69) of the students from Faculty of Engineering were reflective learners whereas 54.4% (n = 93) of the students from Faculty of Administration and 52.2% (n = 12) of the students from Medicine were active learners. However, in sum, the number of active learners was slightly bigger (50.4%, n = 184) than the number of reflective students (49.6%, n = 181).

Table 10

Learning Style Preferences of the Students and Process Dimension

Faculty	*n*	Active *(%)*	*n*	Reflective *(%)*
Education	22	48.9%	23	51.1%
Engineering	57	45.2%	69	54.8%
Administrative Sciences	93	54.4%	78	45.6%
Medicine	12	52.2%	11	47.8%
Total	184	50.4%	181	49.6%

Finally, being education, engineering, administrative sciences, and medicine student did not statistically differ in terms of being active or reflective learners (Table 10). However, related studies claimed that language learners and engineers are more active rather than reflective. Active learners do not learn much in passive environments and prefer to be engaged in physical activity and discussion (Felder, 1993; Felder & Henriques, 1995; Kolb, 1984).

In terms of perception dimension, results indicated that the preferred learning style for all the faculties was sensing. The percentages of the sensing students from different faculties are distributed as the following: Education-82.2% (n = 37), Engineering-70.6% (n = 89), Administration-80% (n = 136), and Medicine-87% (n = 20). Finally, results indicated that there was no difference among the students from different faculties and their LSPs (Table 11). Most students regardless of faculty are sensors because they like to learn facts, solve problems and make connections with real world because they feel more confident when they learn directly with examples. But, courses may present more abstract material and involve memorization.

Table 11

Learning Style Preferences of the Students and Perception Dimension

Faculty	*n*	Sensing *(%)*	*n*	Intuitive *(%)*
Education	37	82.2%	8	17.8%
Engineering	89	70.6%	37	29.4%
Administrative Sciences	136	80%	34	20%
Medicine	20	87%	3	13%
Total	282	77.5%	82	22.5%

In terms of input dimension, most of the students were visual learners (85.9%) rather than verbal learners (14.1%). 82.2% (n = 37) of the students from Faculty of

Education, 93.5% (*n* = 116) of the students from Faculty of Engineering, 81.1% (*n* = 137) of the students from Faculty of Administrative Sciences, and 87% (*n* = 20) of the students from Faculty of Medicine were visual learners. Finally, results indicated that all students regardless of their faculties tend to prefer visual learning styles (Table 12).

Table 12

Learning Style Preferences of the Students and Input Dimension

Faculty	*n*	Visual *(%)*	*n*	Verbal *(%)*
Education	37	82.2%	8	17.8%
Engineering	116	93.5%	8	6.5%
Administrative Sciences	137	81.1%	32	18.9%
Medicine	20	87%	3	13%
Total	310	85.9%	51	14.1%

In terms of understanding dimension, 54.2% (*n* = 198) of the students were global learners while 45.8% (*n* = 167) of them were sequential learners. 62.2% (*n* = 28) of the students from Faculty of Education, 51.6% (*n* = 65) of the students from Faculty of Engineering, 53.2% (*n* = 91) of the students from the students from Faculty of Administrative Sciences and 60.9% (*n* = 14) of the students from Faculty of Medicine were global learners whereas 37.8% (*n* = 17) of the students from Faculty

of Education, 48.4% (n = 61) of the students from Faculty of Engineering, 46.8% (n = 80) of the students from the students from Faculty of Administrative Sciences and 39.1% (n = 9) of the students from Faculty of Medicine were sequential learners. That is, in terms of understanding dimension, the percentage of global learners was slightly higher than sequential learners (Table 13).

Table 13

Learning Style Preferences of the Students and Understanding Dimension

Faculty	*n*	Sequential *(%)*	*n*	Global *(%)*
Education	17	37.8%	28	62.2%
Engineering	61	48.4%	65	51.6%
Administrative Sciences	80	46.8%	91	53.2%
Medicine	9	39.1%	14	60.9%
Total	167	45.8%	198	54.2%

4.2.4 Gender and Learning Style Preferences

The fourth question was stated as 'Do students' LSP differ according to their gender?'

To answer this question the Crosstabs procedure was used. In terms of process dimension, results indicated that 50.1% of male and female students were active learners while 49.9% of them were reflective. When gender is considered, 52.3% of males were reflective and 47.7% of them were active, but the same results were just the opposite for the female students. 53.7% of them were active learners and 46.3% of them were reflective learners. Results indicated that students' being active or reflective does not change much according to their gender Table 14).

Table 14

Process Dimension and Gender

Gender	*n*	Active *(%)*	*n*	Reflective *(%)*
Male	105	47.7%	115	52.3%
Female	79	53.7%	68	46.3%
Total	184	50.1%	183	49.9%

In terms of perception dimension, results indicated that both male (75.8%) and female (80.3%) students were mainly sensing learners. Results indicated that 75.8% of male and 80.3% of female students were sensing while 24.2% of male and 19.7%

of female students were intuitive. That is, in terms of perception both male and female students appear to prefer sensing learning style (Table 15).

Table 15

Perception Dimension and Gender

Gender	*n*	Sensing *(%)*	*n*	Intuitive *(%)*
Male	166	75.8%	53	24.2%
Female	118	80.3%	29	19.7%
Total	284	77.6%	82	22.4%

Similar results were obtained in terms of input dimension. Both male and female students were not different from each other and preferred the visual learning. Results indicated that 88.4% of the male students and 81.6% of the female students preferred visual learning while 11.6% of male and 18.4% of female students were verbal.

Table 16

Input Dimension and Gender

Gender	*n*	Visual *(%)*	*n*	Verbal *(%)*
Male	191	88.4%	25	11.6%
Female	120	81.6%	27	18.4%
Total	311	85.7%	52	14.3%

That is, in terms of input dimension both male and female students appear to prefer visual learning (Table 16).

The results of understanding dimension were similar to the results of process dimension. With a slightly bigger difference, students preferred global learning (54.2%) rather than sequential learning (45.8%). Results indicated that there was no statistically significant difference between the students' gender and their LSPs in terms of understanding dimension (Table 17).

In sum, in terms of process dimension, 53.7% (n = 79) of female students were active learners 46.3% (n = 68) of them were reflective learners. In terms of perception, 80.3% (n = 118) of female students were sensing learners and only 19.7% (n = 29) of them were intuitive learners. In terms of input, 81.6% (n = 120) of female students were visual learners and 18.4% (n = 27) of them were verbal learners. In terms of understanding dimension, the percentage of global learning (51%) was slightly higher than sequential learning (49%).

Table 17

Understanding Dimension and Gender

Gender	*n*	Sequential *(%)*	*n*	Global *(%)*
Male	96	43.6%	124	56.4%
Female	72	49%	75	51%
Total	168	45.8%	199	54.2%

In terms of process, 47.7% (n = 105) of male students were active learners and 52.3% (n = 115). In terms of perception, 75.8% (n =166) of male students were sensing learners and 24.2% (n = 53) of them were intuitive learners. In terms of input, 88.4% (n = 191) of them were visual and only 11.6% (n = 25) were verbal learners. In terms of understanding dimension, 43.6% (n = 96) of them were sequential learners and 56.4% (n = 124) of them were global learners.

4.2.5 Level and Learning Style Preferences

The fifth and final research question was stated as 'What are students' LSP differ according to their level (beginner-elementary-intermediate-upper intermediate) at preparatory school?'

In order to find out the answer to this question, the Crosstabs procedure was used. Overall, the results indicated that beginner students were heavily reflective-sensing-visual-global learners. Elementary students were active-sensing-visual-global, intermediate students were active-sensing-visual-global and finally upper-intermediate students were reflective-sensing-visual-global learners (Table 18, 19, 20, and 21).

In terms of process dimension, regardless of proficiency level, students' LSPs were nearly identical regardless of their proficiency level. In sum, 50.1% (n = 184) of the students were active learners and with a slight difference 49.9% (n = 183) of them are reflective learners.

Table 18

Process Dimension and Level

Level	*n*	Active *(%)*	*n*	Reflective *(%)*
Beginner	74	47.1%	83	52.9%
Elementary	56	53.8%	48	46.2%
Intermediate	33	52.4%	30	47.6%
Upper-Intermediate	21	48.8%	22	51.2%
Total	184	50.1%	183	49.9%

47.1% (n = 74) of beginner students, 53.8% (n = 56) of elementary students, 52.4% (n = 33) of intermediate students and 48.8% (n = 21) of upper-intermediate students were active learners whereas 52.9% (n = 83) of beginner students, 46.2% (n = 48) of elementary students, 47.6% (n = 30) of intermediate students and 51.2% (n = 22) of upper-intermediate students were reflective learners. Percentages indicated that students from different proficiency levels were both active and reflective learners.

In terms of perception dimension, regardless of proficiency level, most of the students preferred sensing learning (77.6%). Regardless of their level, most of the students were detail oriented and liked to learn with their senses whereas 22.4% (n = 82) of the students preferred intuitive learning which is more complicated (Felder & Silverman, 1988). Results indicated that there was no statistically significant

difference between the students' proficiency level and their LSPs in terms of perception dimension (Table 19).

Table 19

Perception Dimension and Level

Level	*n*	Sensing *(%)*	*n*	Intuitive *(%)*
Beginner	118	75.6%	38	24.4%
Elementary	81	77.9%	23	22.1%
Intermediate	50	79.4%	13	20.6%
Upper-Intermediate	35	81.4%	8	18.6%
Total	284	77.6%	82	22.4%

In terms of input dimension, regardless of their proficiency level, most of the students were visual learners (85.7%) rather than verbal learners (14.3%). That is, results indicated that regardless of proficiency level, there was no statistically significant difference between the students' proficiency level and their LSPs in terms of input dimension (Table 20).

Table 20

Input Dimension and Level

Level	*n*	Visual *(%)*	*n*	Verbal *(%)*
Beginner	129	83.2%	26	16.8%
Elementary	94	53.8%	9	46.2%
Intermediate	52	83.9%	10	16.1%
Upper-Intermediate	36	83.7%	7	16.3%
Total	311	85.7%	52	14.3%

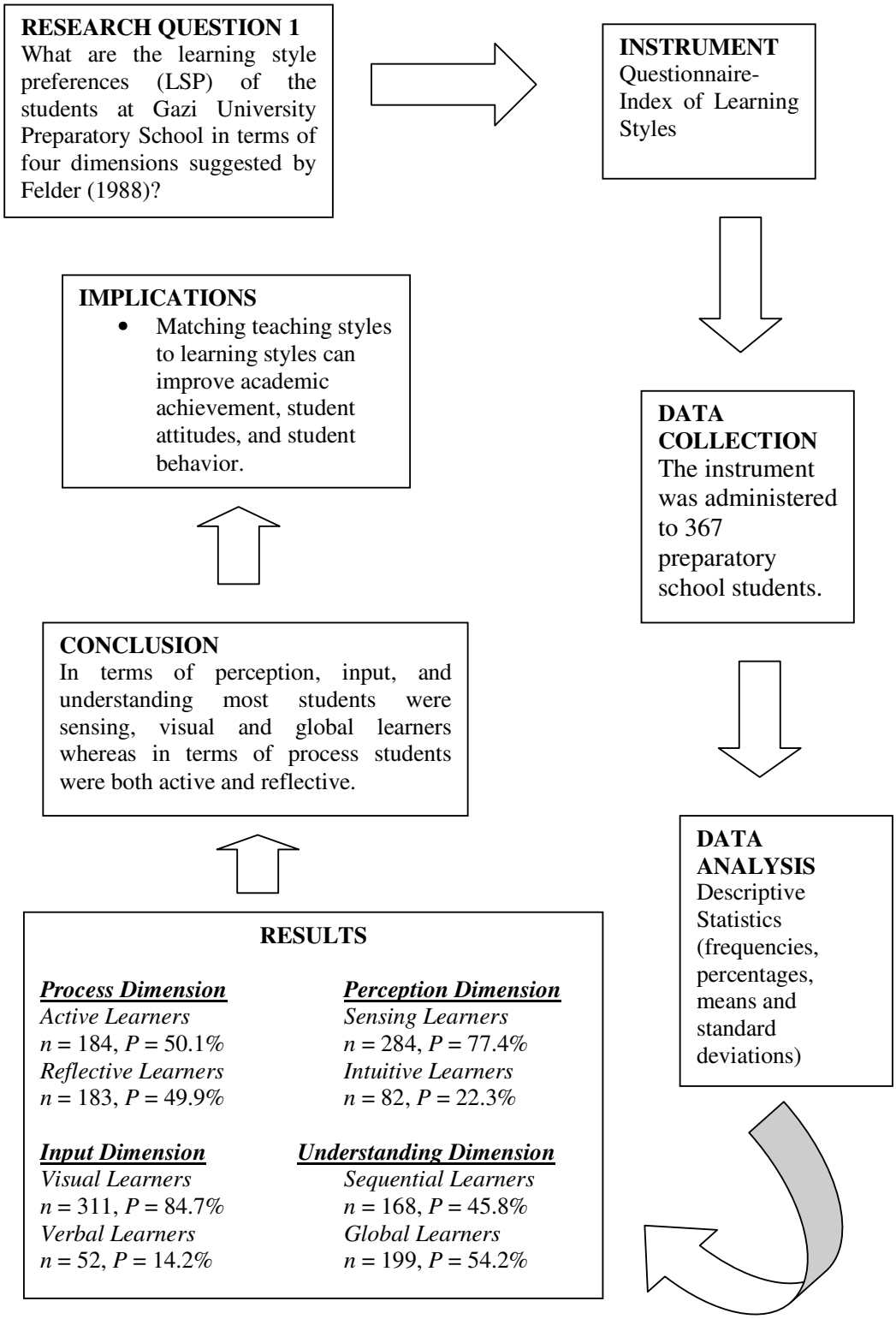
In terms of understanding dimension, 54.2% (n = 199) of the students were global learners and with a slight difference 45.8% (n = 168) of the students were sequential learners. That is, results indicated that regardless of proficiency level, there was no statistically significant difference between the students' proficiency level and their LSPs in terms of understanding dimension (Table 21).

Table 21

Understanding Dimension and Level

Level	*n*	Sequential *(%)*	*n*	Global *(%)*
Beginner	78	49.7%	79	50.3%
Elementary	46	44.2%	58	55.8%
Intermediate	27	42.9%	36	57.1%
Upper-Intermediate	17	39.5%	26	60.5%
Total	168	45.8%	199	54.2%

4.3 Summary of the Results



RESEARCH QUESTION 2
Do students' English language achievement scores differ according to their LSPs? (listening/reading/grammar/writing)

DATA COLLECTION
Students' achievement scores obtained from 4 mid-terms that consist of listening/reading/grammar/writing were collected from the records of Gazi University.

DATA ANALYSIS
Independent-samples *t*-test

***OVERALL* RESULTS**

Process Dimension
t (364.81) = .17, $p > .05$

Perception Dimension
t (139.18) = 1.5, $p > .05$

Input Dimension
t (71.09) = 1.47, $p > .05$

Understanding Dimension
t (330) = 1.68, $p > .05$

LISTENING RESULTS

Process Dimension
t (363.82) = -.09, $p > .05$

Perception Dimension
t (137.13) = 1.24, $p > .05$

Input Dimension
t (68.05) = 1.45, $p > .05$

Understanding Dimension
t (349.52) = -1.302, $p > .05$

READING RESULTS

Process Dimension
t (364.29) = -.31, $p > .05$

Perception Dimension
t (138.58) = 1.58, $p > .05$

Input Dimension
t (68.27) = 1.49, $p > .05$

Understanding Dimension
t (330.07) = -1.83, $p > .05$

GRAMMAR RESULTS

Process Dimension
t (364.98) = .51, $p > .05$

Perception Dimension
t (134.84) = 1.03, $p > .05$

Input Dimension
t (70.52) = .97, $p > .05$

Understanding Dimension
t (334.29) = -1.49, $p > .05$

WRITING RESULTS

Process Dimension
t (364.99) = .12, $p > .05$

Perception Dimension
t (144.46) = 1.77, $p > .05$

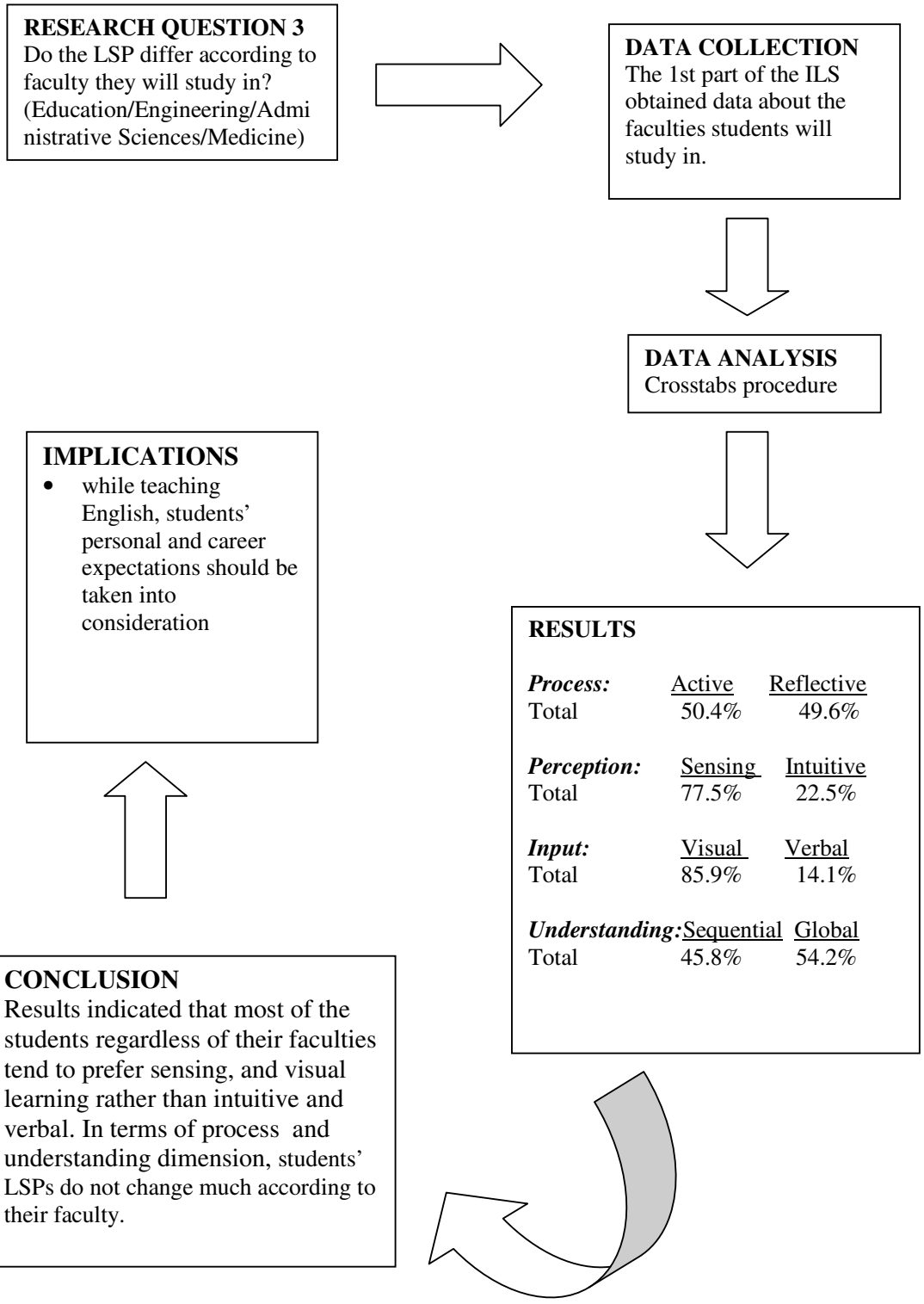
Input Dimension
t (78.05) = 1.63, $p > .05$

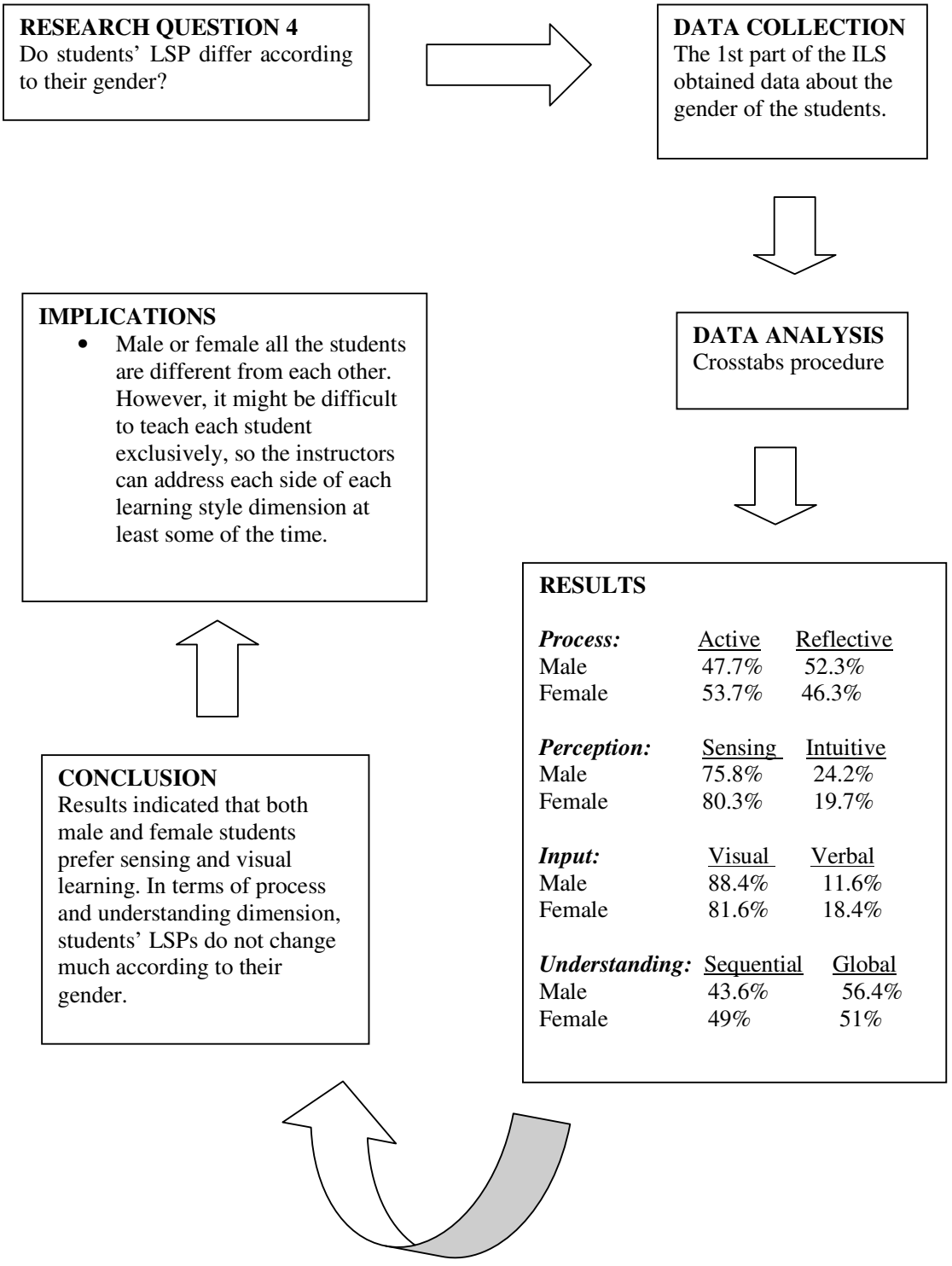
Understanding Dimension
t (349.27) = -.86, $p > .05$

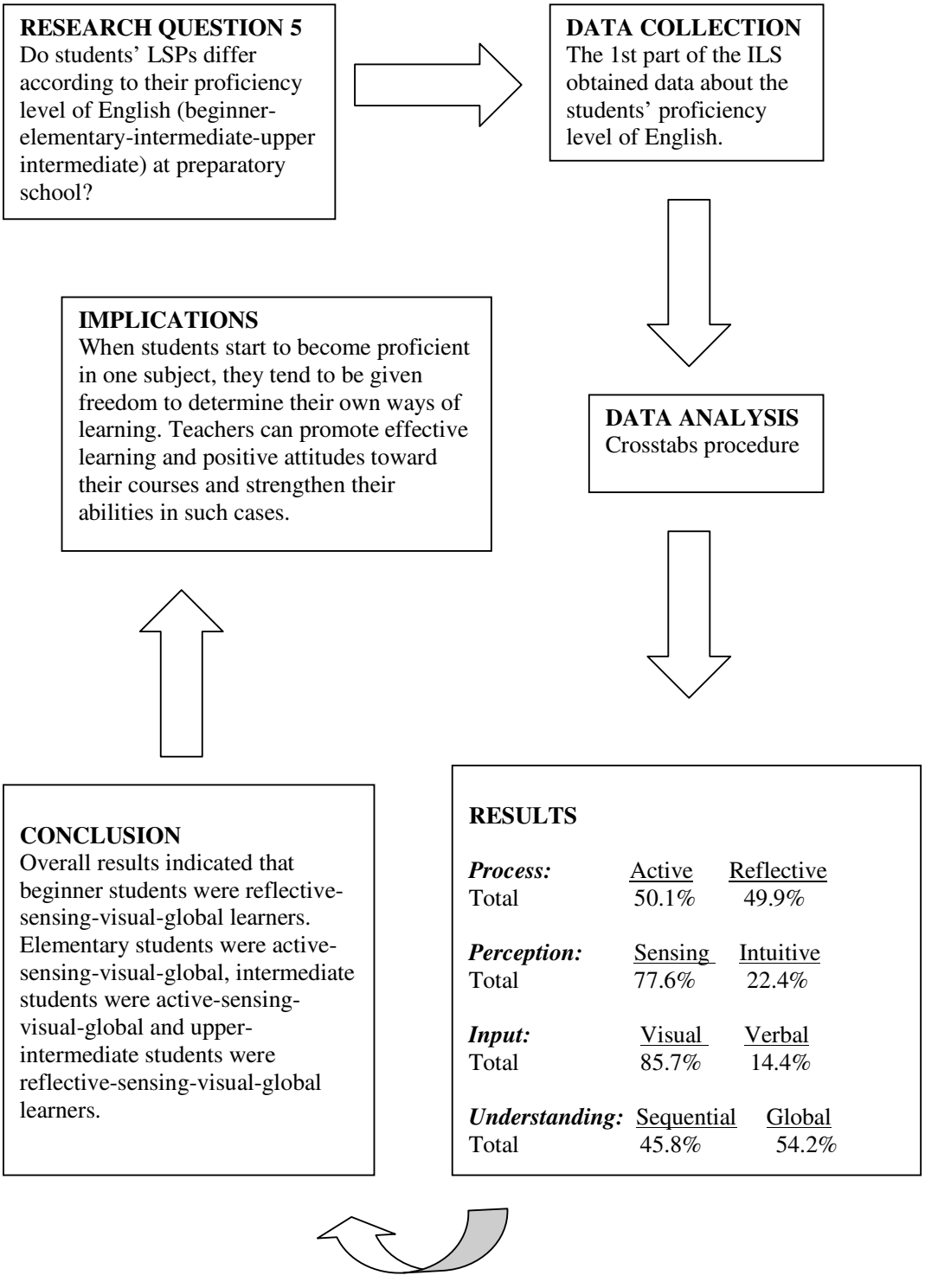
IMPLICATIONS
- To increase the success, instructors can liven up the courses by organizing various activities that address to majority of the students.
- integration of skills can increase achievement scores

CONCLUSION
Overall Result: Being active or reflective, sensing or intuitive, visual or verbal, and sequential or global does not influence students' overall achievement.

***t*-test results** revealed that there wasn't statistically significant difference in students' **listening**, **reading**, **grammar** and **writing scores** according to their LSPs.


RESEARCH QUESTION 3
Do the LSP differ according to faculty they will study in? (Education/Engineering/Administrative Sciences/Medicine)
DATA COLLECTION
The 1st part of the ILS obtained data about the faculties students will study in.
DATA ANALYSIS
Crosstabs procedure
RESULTS
Process: Active Reflective
Total 50.4% 49.6%
Perception: Sensing Intuitive
Total 77.5% 22.5%
Input: Visual Verbal
Total 85.9% 14.1%
Understanding: Sequential Global
Total 45.8% 54.2%
IMPLICATIONS
• while teaching English, students' personal and career expectations should be taken into consideration
CONCLUSION
Results indicated that most of the students regardless of their faculties tend to prefer sensing, and visual learning rather than intuitive and verbal. In terms of process and understanding dimension, students' LSPs do not change much according to their faculty.


RESEARCH QUESTION 4
Do students' LSP differ according to their gender?
DATA COLLECTION
The 1st part of the ILS obtained data about the gender of the students.
DATA ANALYSIS
Crosstabs procedure
RESULTS
Process: Active Reflective
Male 47.7% 52.3%
Female 53.7% 46.3%
Perception: Sensing Intuitive
Male 75.8% 24.2%
Female 80.3% 19.7%
Input: Visual Verbal
Male 88.4% 11.6%
Female 81.6% 18.4%
Understanding: Sequential Global
Male 43.6% 56.4%
Female 49% 51%
IMPLICATIONS
Male or female all the students are different from each other. However, it might be difficult to teach each student exclusively, so the instructors can address each side of each learning style dimension at least some of the time.
CONCLUSION
Results indicated that both male and female students prefer sensing and visual learning. In terms of process and understanding dimension, students' LSPs do not change much according to their gender.


RESEARCH QUESTION 5
Do students' LSPs differ according to their proficiency level of English (beginner-elementary-intermediate-upper intermediate) at preparatory school?
DATA COLLECTION
The 1st part of the ILS obtained data about the students' proficiency level of English.
DATA ANALYSIS
Crosstabs procedure
RESULTS
Process: Active Reflective
Total 50.1% 49.9%
Perception: Sensing Intuitive
Total 77.6% 22.4%
Input: Visual Verbal
Total 85.7% 14.4%
Understanding: Sequential Global
Total 45.8% 54.2%
CONCLUSION
Overall results indicated that beginner students were reflective-sensing-visual-global learners. Elementary students were active-sensing-visual-global, intermediate students were active-sensing-visual-global and upper-intermediate students were reflective-sensing-visual-global learners.
IMPLICATIONS
When students start to become proficient in one subject, they tend to be given freedom to determine their own ways of learning. Teachers can promote effective learning and positive attitudes toward their courses and strengthen their abilities in such cases.

CHAPTER 5

DISCUSSION, CONCLUSIONS AND IMPLICATIONS

This chapter is devoted to the conclusions of the study, implications for teaching and implications for further research.

5.1 Discussion and Conclusions

This study aimed to determine the learning style of preparatory school students from different faculties at Gazi University and to examine whether there was any relationship between students' LSPs according to faculty they will study in, gender, level and achievement scores (listening, reading, grammar, and writing). In order to determine the LSPs of the preparatory school students at Gazi University, descriptive statistics was used to portray the frequencies, percentages, means and standard deviations for each of the learning style dimensions. Then, an independent-samples *t* test was conducted to see whether students' achievement scores differ according to their LSPs. Finally, the Crosstabs procedure was conducted to find out whether the LSP of the students at Gazi University differ according to faculty they will study in, gender and proficiency level of English.

The data collection instrument used in the study was the Index of Learning Styles (ILS) that classifies students on four learning style dimensions – process, perception, input and understanding – according to Felder and Silverman's Learning Style Model (1988) and is developed by Felder and Soloman (1996). This instrument was prepared especially for engineering students, but it was not limited only to them. The ILS was also used with studies on language learning, computer-based

environments, social sciences, and so on (Felder, 1996; Felder & Henriques, 1995; Hong & Kinshuk, 2004). In this study ILS was administered to 367 students out of 1633 preparatory school students from Gazi University, in Ankara. These students were coming from four different faculties (Education, Engineering, Administrative Sciences and Medicine).

Lane (2001) claims that our styles of learning can result in improved attitudes toward learning and an increase in productivity, academic achievement and creativity. Individual can learn better, smarter, faster and retain more information when material is presented in one's preferred learning style. In this study, it was also assumed that to some extent, being aware of the learning styles of the students might have given us a few clues why they were successful or not in the mid-terms. There might be some reasons why learning styles do not affect student achievement at Gazi University. I, the researcher of this study, work as an English instructor at Gazi University and I am involved in the teaching-learning cycle at that university. As in most Turkish universities there is of lack of material and equipment such as language labs, English broadcasting programs (TV or internet), computers at Gazi University. The coursebook of the English course might not be enough to show whether students make use of their learning styles at school. Moreover, as courses are not presented in students' preferred learning styles, mid-terms are not prepared accordingly. Thus, results of the study did not indicate significant differences in terms of achievement.

An independent-samples *t* test was conducted to evaluate whether students' achievement scores differ according to their LSPs. Results indicated that students' achievement scores did not significantly differ according to their LSPs. In other words, being active or reflective, sensing or intuitive, visual or verbal and sequential

or global does not influence students' overall achievement in listening, reading, grammar and writing.

Students learn in variety of ways – by seeing and hearing; reflecting and acting; reasoning logically and intuitively; memorizing and visualizing. Learning styles are not fixed throughout life, but develop as a person learns and grows. Most learning-style advocates would agree that all individuals develop and practice a mixture of styles as they live and learn. Most people's styles flex and adapt to various contexts, though to differing degrees. In fact, most people seek a sense of wholeness by practicing all four styles to some degree. Educators should help students discover their unique profiles, as well as a balance of styles (Silver, Strong & Perini, 1997). In this study, regardless of faculty, gender and level most of the students were sensing (77.4%), visual (84.7%) and global (54.2%) whereas in terms of process dimension students were both active (50.1%) and reflective (49.9%).

The first learning style dimension mentioned in this research is process dimension (active/reflective). Language classes in which all students are relegated to passive roles, listening to and observing the instructor and taking notes, do little to promote learning for either active or reflective learners. Therefore, they suggest that language classes should include a variety of active learning experiences, such as conversations, enactment of dialogues and dramas, and team competitions, and reflective experiences, such as brief writing exercises and question formulation exercises. The students from social sciences also tend to be both active and reflective. However, engineers are more likely to be active than reflective learners. Active learners do not learn much in situations that require them to be passive (such as most lectures) and they tend to be experimentalists, but reflective learners learn in situations that

provide opportunity to think about the information being presented (such as most lectures) and they tend to be theoreticians (Felder & Silverman, 1988). In this study, all the students regardless of their faculty, gender and proficiency level were equally active or reflective. According to Kolb (1984) the traditional nonprofessional collegiate learning environment is highly reflective and develops this orientation in its students. As a result, the transition from education to work involves for many a transition from a reflective learning orientation to an active one. In this study, the students were equally active and reflective, so it might be concluded that the learning environment at Gazi University is equally active and reflective.

In terms of the second dimension, perception dimension (sensing/intuitive), language learning seems to be more attractive to intuitors than to the more concrete and literal-minded sensors (Felder & Henriques, 1995). Sensing learners learn best when given facts and procedures, but most science courses focus on abstract concepts, theories, and formulas. Moreover, sensors are not successful with symbols like intuitors. Felder and Silverman (1988) indicated that most engineering courses emphasize concepts rather than facts and use primarily lectures and readings (words, symbols) to transmit information, and so favor intuitive learners. On the other hand, the majority of engineering students are sensors, suggesting a serious learning/teaching style mismatch in most engineering courses. The described situation is similar at Turkish schools. Results obtained in this research study show that most of the preparatory school students at Gazi University, in Ankara are sensing learners regardless of faculty they will study in, gender and proficiency level of English, but the English courses taught at Gazi University favor intuitive learners.

Input dimension classifies the ways people receive information as visual and verbal. Visual learners prefer visual representations, such as pictures, diagrams, flow charts, films, and demonstrations. Verbal learners, on the other hand, prefer spoken or written explanations. Most people and presumably most students are visual learners while the information presented in almost every course is verbal, such as written words and formulas in texts and on the board, spoken words in lectures (Felder, 1993). In this research study, regardless of faculty, gender and proficiency level of English most of the preparatory school students were visual learners. The results of this research study indicated that there was significantly no difference between the faculties the students will study in, gender, and proficiency level of English and students' being visual or verbal learners.

The last dimension is understanding dimension which classifies the ways people receive information as sequential and global. Sequential learners absorb information and acquire understanding of material in small connected chunks whereas global learners absorb information in unconnected fragments. Most formal education is more suitable for sequential learners because in formal education the material is presented in a logically ordered progression. When a body of material is covered, the students are tested on their mastery and then move to the next stage (Felder & Silverman, 1988). For example, sequential language learners are comfortable with such structured teaching approaches that are based on grammatical structure whereas global language learners prefer to be free to devise their own methods of learning rather than being forced to adopt the professor's strategy (Felder & Henriques, 1995). In this research study, only in understanding dimension, there were slightly different results. Preparatory school students from Faculty of Engineering and

Administrative Sciences were both sequential and global learners. However, majority of the students from Faculty of Education – Department of Foreign Language Education – and Faculty of Medicine were global learners. In terms of gender, the students were equally sequential and global learners. In terms of proficiency level of English, the majority of the upper-intermediate level was global learners whereas beginner level students were equally sequential or global. That is, when students start to become proficient in one subject, they tend to be given freedom to determine their own ways of learning. This study was done with prep students who were 1st year students at university. Although people choose fields that are consistent with their learning styles, the prep students are not equipped with field-knowledge (Kolb, 1984). In the first years of their field education, students might be mainly sequential because they need more structured, organized and teacher-oriented learning to gain experience in their fields. However, 4th year students might be mainly global learners because they become more field-experienced and might determine their own learning ways. Students are further shaped to fit the learning norms of their field once they are in it (Kolb).

5.2 Implications for Teaching

Not only students learn in different ways but also teachers teach with various methods. Some of them lecture, others demonstrate or discus; some focus on principles and others on applications; some emphasize memory and others understanding. Therefore, teaching and learning style dimensions parallel one another. For example, an intuitive learner would respond well to an instructor who emphasizes concepts rather than facts (Felder & Silverman, 1988).

Studies show that matching teaching styles to learning styles can significantly improve academic achievement, student attitudes, and student behavior. In order to increase the quality of education, the instructors can modify their teaching styles to accommodate the learning styles of all the students in their classes. The LSPs of the students can be determined at the beginning of each school year and the teachers can discuss how students' LSPs help or hinder learning ability (Hodgin & Wooliscroft, 1997). Or, if it is difficult to determine each student's learning style and then teach to it exclusively, the teachers can address each side of each learning style dimension at least some of the time. If this balance could be achieved in courses, the students would all be taught in a manner that sometimes matches their learning styles. Teachers can promote effective learning and positive attitudes toward their courses and strengthen their skills (Felder, 1993; Felder & Henriques, 1995).

5.3 Implications for Further Research

The results of this study indicated that there wasn't difference between faculty preparatory school students will study in, gender, and proficiency level of English and their LSPs. Also, students' achievement scores did not significantly differ in terms of their LSPs. Further research may study the reasons why the results did not indicate significant differences on the variables such as faculty, gender, proficiency level and achievement scores because various studies claim that learning style preferences have a great effect on academic achievement, student attitudes, and student behavior.

Another further research may focus on teaching and learning styles. It is necessary to find out the teaching styles and see whether they match the students' LSPs. A serious mismatch exists between the teaching styles of Turkish teachers and learning style preferences of their students. If this mismatch is improved, the quality of education might improve. Being aware of the learning styles of the students, knowing their likes, dislikes, easy ways of learning may facilitate both teaching and learning and make this learning-teaching cycle much more effective.

Although we are aware of the differences among students and our teachers are taught to take these differences into account in their teaching, we accept students and teachers as prototypes. There are studies on personality differences of both students and teachers and what influences teacher's teaching and student's learning (Cruickshank, Jenkins & Metcalf, 2003). Moreover, researchers should develop more studies that emphasize personality differences that are shaped according to family, culture, school environment.

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APPENDICES

APPENDIX A

INDEX OF LEARNING STYLES

This study will determine the learning styles of preparatory school students at university. The first part of the questionnaire aims to get personal information, and in the second part there are questions that will determine your learning styles. Please read the questions in each part carefully and answer them.

PART I:

1. Name:_____
2. Faculty: _____
3. Department: _____
4. Class: _____
5. Age: _____
6. Sex: Female □ Male □

PART II:

For each of the 44 questions below circle either "a" or "b" to indicate your answer. Please choose only one answer for each question. The answers are neither right nor wrong. If both "a" and "b" seem to apply to you, choose the one that applies more frequently.

1. I understand something better after I
(a) try it out.
(b) think it through.

2. I would rather be considered
(a) realistic.
(b) innovative.

3. When I think about what I did yesterday, I am most likely to get
(a) a picture.
(b) words.

4. I tend to
(a) understand details of a subject but may be fuzzy about its overall structure.
(b) understand the overall structure but may be fuzzy about details.

5. When I am learning something new, it helps me to
(a) talk about it.
(b) think about it.

6. If I were a teacher, I would rather teach a course
(a) that deals with facts and real life situations.
(b) that deals with ideas and theories.

7. I prefer to get new information in
(a) pictures, diagrams, graphs, or maps.
(b) written directions or verbal information.

8. Once I understand
(a) all the parts, I understand the whole thing.
(b) the whole thing, I see how the parts fit.

9. In a study group working on difficult material, I am more likely to
(a) jump in and contribute ideas.
(b) sit back and listen.

10. I find it easier
(a) to learn facts.
(b) to learn concepts.

11. In a book with lots of pictures and charts, I am likely to
(a) look over the pictures and charts carefully.
(b) focus on the written text.

12. When I solve math problems
(a) I usually work my way to the solutions one step at a time.
(b) I often just see the solutions but then have to struggle to figure out the steps to get to them.

13. In classes I have taken
(a) I have usually gotten to know many of the students.
(b) I have rarely gotten to know many of the students.

14. In reading nonfiction, I prefer
(a) something that teaches me new facts or tells me how to do something.
(b) something that gives me new ideas to think about.

15. I like teachers
(a) who put a lot of diagrams on the board.
(b) who spend a lot of time explaining.

16. When I'm analyzing a story or a novel
(a) I think of the incidents and try to put them together to figure out the themes.
(b) I just know what the themes are when I finish reading and then I have to go back and find the incidents that demonstrate them.

17. When I start a homework problem, I am more likely to
(a) start working on the solution immediately.
(b) try to fully understand the problem first.

18. I prefer the idea of
(a) certainty.
(b) theory.

19. I remember best
(a) what I see.
(b) what I hear.

20. It is more important to me that an instructor
(a) lay out the material in clear sequential steps.
(b) give me an overall picture and relate the material to other subjects.

21. I prefer to study
(a) in a study group.
(b) alone.

22. I am more likely to be considered
(a) careful about the details of my work.
(b) creative about how to do my work.

23. When I get directions to a new place, I prefer
(a) a map.
(b) written instructions.

24. I learn
(a) at a fairly regular pace. If I study hard, I'll "get it."
(b) in fits and starts. I'll be totally confused and then suddenly it all "clicks."

25. I would rather first
(a) try things out.
(b) think about how I'm going to do it.

26. When I am reading for enjoyment, I like writers to
(a) clearly say what they mean.
(b) say things in creative, interesting ways.

27. When I see a diagram or sketch in class, I am most likely to remember
(a) the picture.
(b) what the instructor said about it.

28. When considering a body of information, I am more likely to
(a) focus on details and miss the big picture.
(b) try to understand the big picture before getting into the details.

29. I more easily remember
(a) something I have done.
(b) something I have thought a lot about.

30. When I have to perform a task, I prefer to
(a) master one way of doing it.
(b) come up with new ways of doing it.

31. When someone is showing me data, I prefer
(a) charts or graphs.
(b) text summarizing the results.

32. When writing a paper, I am more likely to
(a) work on (think about or write) the beginning of the paper and progress forward.
(b) work on (think about or write) different parts of the paper and then order them.

33. When I have to work on a group project, I first want to
(a) have "group brainstorming" where everyone contributes ideas.
(b) brainstorm individually and then come together as a group to compare ideas.

34. I consider it higher praise to call someone
(a) sensible.
(b) imaginative.

35. When I meet people at a party, I am more likely to remember
(a) what they looked like.
(b) what they said about themselves.

36. When I am learning a new subject, I prefer to
(a) stay focused on that subject, learning as much about it as I can.
(b) try to make connections between that subject and related subjects.

37. I am more likely to be considered
(a) outgoing.
(b) reserved.

38. I prefer courses that emphasize
(a) concrete material (facts, data).
(b) abstract material (concepts, theories).

39. For entertainment, I would rather
(a) watch television.
(b) read a book.

40. Some teachers start their lectures with an outline of what they will cover. Such outlines are
(a) somewhat helpful to me.
(b) very helpful to me.

41. The idea of doing homework in groups, with one grade for the entire group,
(a) appeals to me.
(b) does not appeal to me.

42. When I am doing long calculations,
(a) I tend to repeat all my steps and check my work carefully.
(b) I find checking my work tiresome and have to force myself to do it.

43. I tend to picture places I have been
(a) easily and fairly accurately.
(b) with difficulty and without much detail.

44. When solving problems in a group, I would be more likely to
(a) think of the steps in the solution process.
(b) think of possible consequences or applications of the solution in a wide range of areas.

APPENDIX B

ÖĞRENME STİLLERİ İNDEKSİ

Yönerge

Bu çalışma, hazırlık okulunda okuyan üniversite öğrencilerinin genelde nasıl öğrendiklerini betimlemek amacıyla yapılmaktadır. Aracın 1. bölümünde kişisel bilgiler, 2. bölümünde ise öğrenme stillerini betimlemeye yönelik bilgiler yer almaktadır. Lütfen her bölümdeki soruları dikkatlice okuyunuz ve cevaplayınız.

BÖLÜM I:

1. Adınız: _____
2. Fakülteniz: _____
3. Bölümünüz:_____
4. Sınıfınız:_____
5. Yaşınız:_____
6. Cinsiyetiniz: Kadın □ Erkek □

BÖLÜM II:

Yönerge

Aşağıdaki soruları cevaplamak için "a" ya da "b" seçeneklerinden birini daire içine alınız. Lütfen her soru için sadece bir cevap veriniz. Bu soruların doğru ya da yanlış cevabı yoktur. Her iki seçenekten size en uygun olanını işaretleyiniz.

1. Bir şeyi …….. sonra daha iyi anlarım.
   (a) yaptıktan
   (b) detaylı düşündükten

2. Daha çok …….. olarak görülmek isterim.
   (a) gerçekçi
   (b) yaratıcı

3. Dün ne yaptığımı düşündüğümde, aklıma daha çok
   (a) bir resim gelir.
   (b) kelimeler gelir.

4. Genellikle ……. kafamda belirsizlikler kalır.
   (a) bir konuyla ilgili ayrıntıları anlarım ama bütünü hakkında
   (b) bütünü anlarım ama detayları konusunda

5. Yeni bir şey öğrenirken, o konu hakkında
   (a) konuşurum.
   (b) düşünürüm.

6. Bir öğretmen olsam,
   (a) gerçekleri ve gerçek yaşamda karşılaşabileceğimiz durumları öğretmek isterim.
   (b) düşünceleri ve teorileri öğretmek isterim.

7. Yeni bilgileri …… edinmeyi tercih ederim.
   (a) resimler, şemalar, grafikler, ya da haritalardan
   (b) yazılı ifadelerden ve sözel bilgilerden

8. Eğer,
   (a) parçaları anlarsam bütünü de anlarım.
   (b) bütünü anlarsam, parçaların nasıl birleştiğini de anlarım.

9. Zor bir konu üzerinde çalışan bir grupta, grup üyesi olarak genellikle
   (a) aktif olarak katılır, fikirler üretirim.
   (b) sadece oturur ve dinlerim.

10. ……. öğrenmeyi daha kolay bulurum.
   (a) Olguları / Hakikatleri (facts)
   (b) Kavramları

11. İçinde bir çok resim ve grafik olan bir kitapta, daha çok,
   (a) resim ve tabloları dikkatlice incelerim.
   (b) yazılı metinin üzerinde dururum.

12. Matematik problemleri çözerken,
   (a) genellikle problemin çözümünü kendi yöntemlerimi kullanarak adım adım çözerim.
   (b) çözümü çoğu kez hemen görürüm ancak çözüme ulaşmak için gerekli adımları bulmam için uğraşmam gerekir.

13. Almakta olduğum derslerdeki,
   (a) öğrencilerin çoğunu genellikle tanırım.
   (b) öğrencilerin bir kısmını tanırım.

14. Düz yazıları (makale vb.) / bilimsel yazıları okurken …….. tercih ederim.
    (a) yeni olguları / hakikatleri öğreten ya da bir şeyin nasıl yapılacağını anlatanları
    (b) bana üzerinde düşünebileceğim yeni fikirler verenleri

15. Derste …….. öğretmenleri severim.
    (a) şemalar ve şekiller kullanan
    (b) zamanının çoğunu konu hakkında açıklama yaparak geçiren

16. Bir hikayeyi ya da romanı analiz ederken,
    (a) olayları düşünür, temaları çıkarmak için onları birleştirmeye çalışırım.
    (b) okumayı bitirdiğimde temaları anlamış olurum ve bu temaları örneklendiren olayları bulmak için geri dönmem gerekir.

17. Bir ev ödevine başladığım zaman, çoğunlukla
    (a) hemen çözüm üzerinde çalışmaya başlarım.
    (b) ilk önce problemi tam olarak anlamaya çalışırım.

18. ……. tercih ederim.
    (a) Kesinliği
    (b) Teoriyi

19. ……. daha iyi hatırlarım.
    (a) Gördüğümü
    (b) Duyduğumu

20. Bana göre bir öğretmenin ……. daha önemlidir.
    (a) konuyu belirgin ve düzenli bir sırayla sunması
    (b) bütünü göstermesi ve konuyu diğer konularla bağdaştırması

21. ……..çalışmayı tercih ederim.
    (a) Grup içinde
    (b) Yalnız

22. Daha çok …….. olarak düşünülebilirim.
    (a) işimin detayları konusunda dikkatli
    (b) işimi nasıl yapmam konusunda yaratıcı

23. Bana bir yer tarif edilirken tercihim,
    (a) bir haritadır.
    (b) yazılı talimattır.

24. Yeni bir konuyu öğrenirken,
    (a) oldukça düzenli bir hızda öğrenirim. Eğer çalışırsam başarırım.
    (b) düzensiz olarak öğrenirim. Tamamen kafam karışır ve sonra aniden her şey yerine oturur.

25. Bir şeyi öncelikle,
    (a) denemeyi tercih ederim.
    (b) nasıl yapacağımı düşünmeyi tercih ederim.

26. Kendi zevkim için okuduğumda, …… yazarlardan hoşlanırım.
    (a) anlatmak istediklerini net olarak ifade eden
    (b) düşüncelerini yaratıcı ve ilginç yollarla anlatan

27. Sınıfta bir şema ya da taslak görürsem, çoğunlukla
    (a) görüntüyü hatırlarım.
    (b) öğretmenin konuyla ilgili söylediklerini hatırlarım.

28. Bir bilginin bütünü düşünüldüğünde, çoğunlukla
    (a) detaylara odaklanır büyük resmi kaçırırım.
    (b) detaylara geçmeden önce büyük resmi anlamaya çalışırım.

29. ……. daha kolay hatırlarım.
    (a) Yaptığım bir şeyi
    (b) Üzerinde çok düşündüğüm bir şeyi

30. Bir görev yerine getirmem gerektiğinde, ……..tercih ederim.
    (a) o işi yapma yollarından birinde uzmanlaşmayı
    (b) o işi yapmak için farklı yollar bulmayı

31. Birisi bana veri gösterirken tercihim,
    (a) şema ve grafiklerdir.
    (b) sonuçları özetleyen bir metindir.

32. Bir yazı (makale) yazarken, daha çok
    (a) yazının başlangıcında üzerinde çalışır (düşünür ya da yazar) sonra iletirim.
    (b) yazının farklı kısımları üzerinde durur (düşünür ya da yazar) ve sonra bunları düzenlerim.

33. Bir grup projesi üzerinde çalışmak durumundaysam, öncelikle
    (a) herkesin kendi fikriyle katkıda bulunduğu bir "beyin fırtınası" yapmak isterim.
    (b) bireysel fikirlerimi oluşturmayı ve sonra grupla fikirlerimi karşılaştırmayı isterim.

34. Birisinin …… olarak nitelendirilmesini büyük bir övgü olarak görürüm.
    (a) mantıklı, anlayışlı
    (b) hayal gücü kuvvetli

35. Bir partide tanıştığım insanlar hakkında aklımda daha çok
    (a) fiziksel özellikleri kalır.
    (b) kendileri hakkında söyledikleri şeyler kalır.

36. Yeni bir konu öğrenirken,
    (a) konuya odaklanmış olarak kalır, konuyla ilgili öğrenebildiğim kadar çok şey öğrenirim.
    (b) o konu ve ilgili konular arasında bağlantılar kurmaya çalışırım.

37. Daha çok ……. olarak nitelendirilebilirim.
    (a) dışa dönük
    (b) içe dönük

38. …… üzerinde duran dersleri tercih ederim.
    (a) somut materyaller (olgular / hakikatler, veriler)
    (b) soyut materyaller (kavramlar, teoriler)

39. Eğlenmek için genellikle,
    (a) televizyon izlerim.
    (b) kitap okurum.

40. Bazı öğretmenler derslerine işleyecekleri konuların ana hatlarını belirterek başlarlar. Bu taslaklar bana,
    (a) pek yardımcı olmaz.
    (b) çok yardımcı olur.

41. Tüm gruba tek bir notun verildiği grup ödevi yapma fikri bana
    (a) cazip gelir.
    (b) pek cazip gelmez.

42. Uzun hesaplamalar yaparken,
    (a) tüm aşamaları tekrar etme ve işimi dikkatle yapma eğilimindeyimdir.
    (b) yaptığım işi kontrol etmeyi yorucu bulurum ve bunu yapmak için kendimi zorlarım.

43. Gittiğim/gördüğüm yerleri …….. gözümde canlandırabilirim.
    (a) kolaylıkla ve oldukça düzgün
    (b) güçlükle ve çok ayrıntıya girmeden

44. Bir grubun üyesi olarak, grup içinde problem çözerken çoğunlukla,
    (a) çözüm sürecindeki aşamaları düşünürüm.
    (b) çözümün olası sonuçları veya uygulamalarını kapsamlı bir şekilde düşünürüm.