PARTICIPANTS' PERCEPTIONS ABOUT ONLINE INFORMATION TECHNOLOGIES CERTIFICATE PROGRAM: A CASE STUDY

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
MIDDLE EAST TECHNICAL UNIVERSITY

BY

ERMAN YÜKSELTÜRK

IN PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

IN

THE DEPARTMENT OF COMPUTER EDUCATION AND INSTRUCTIONAL TECHNOLOGIES

JULY 2003

Approval of the Graduate School of Natural and Applied Sciences

Prof. Dr. Canan ÖZGEN
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

Prof. Dr. M. Yaşar ÖZDEN
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Asst. Prof. Dr. Zahide YILDIRIM
Supervisor

Examining Committee Members

Prof. Dr. M.Yaşar ÖZDEN _____

Assoc. Prof. Dr. Safure BULUT _____

Asst. Prof. Dr. Soner YILDIRIM _____

Asst. Prof. Dr. Kürşat ÇAĞILTAY _____

Asst. Prof. Dr. Zahide YILDIRIM _____

ABSTRACT

PARTICIPANTS' PERCEPTIONS ABOUT ONLINE INFORMATION TECHNOLOGIES CERTIFICATE PROGRAM: A CASE STUDY

Yükseltürk, Erman

M.S., Department of Computer Education and Instructional Technology

Supervisor: Asst. Prof. Dr. Zahide Yıldırım

July 2003, 173 pages

In this study, the participants' perceptions about Information Technologies Certificate Program which was based on synchronous and asynchronous communication methods over the Internet offered by cooperation of Middle East Technical University, Computer Engineering Department and Continuing Education Center were examined. This online certificate program started in May 1998. The program includes eight fundamental courses of Computer Engineering Department and comprised of four semesters lasting nine months. The courses in the program are given by instructors of Computer Engineering Department.

In the study, participants' perceptions about Information Technologies Certificate Program in regard to four major items which were preferences, course effectiveness, learner support and computer mediated communication were examined and the study included the 3rd, 4th and 5th programs' participants who attended the certificate programs. The data were collected by using online survey at the end of the each term of programs and analyzed by using descriptive statistical analyzing methods.

The results showed that there was a parallelism between participants' perceptions and aims of Information Technologies Certificate Program. It was revealed that the courses in the program were effective in general and majority of the participants found learner support satisfied. The results showed that the participants were satisfied with computer mediated communication provided in program, however, the chat sessions were not beneficial enough. In addition to these, participants made important suggestions to improve the program.

Keywords: Computer Mediated Communication, Synchronous Communication, Asynchronous Communication, Student Perceptions, Internet Based Education.

ÖZ

ÇEVRİM-İÇİ BİLGİ TEKNOLOJİLERİ SERTİFİKA PROGRAMI HAKKINDA KATILIMCILARIN ALGILARI: BİR DURUM ÇALIŞMASI

Yükseltürk, Erman

Yüksek Lisans, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü

Tez Yöneticisi: Asst. Prof. Dr. Zahide Yıldırım

Temmuz 2003, 173 sayfa

Bu araştırmada, Orta Doğu Teknik Üniversitesi, Bilgisayar Mühendisliği Bölümü ve Sürekli Eğitim Merkezi işbirliği ile yürütülen İnternet üzerinden eşzamanlı ve eşzamansız iletişim yöntemleri kullanılarak verilen Bilgi Teknolojileri Sertfika Programına katılan öğrencilerin bu program hakkındaki görüşleri incelenmiştir. Bu çevrim-içi sertifika programı 1998 yılı Mayıs ayında başlamıştır. Program, Bilgisayar Mühendisliği Bölümündeki sekiz temel dersi kapsamakta ve dokuz ay süren dört dönemden oluşmaktadır. Programda yer alan dersler Bilgisayar Mühendisliği Bölümü öğretim elemanları tarafından verilmektedir.

Araştırmada, katılımcıların algıları, Bilgi Teknolojileri Sertfika Programı hakkındaki öncelikleri, programda yeralan derslerin etkinliği, öğrenci desteği ve bilgisayar destekli iletişim hakkındaki algıları olmak üzere dört ana temada incelenmiş ve araştırma üçüncü, dördüncü ve beşinci Bilgi Teknolojileri Sertifika Programlarına katılan kişileri kapsamaktadır. Veriler her dönemin sonunda uygulanan çevrim-içi anketler yoluyla toplanmış ve tanımlayıcı istatistiki analiz yöntemleri kullanılarak analiz edilmiştir.

Bulgular katılımcıların öncelikleri ile Bilgi Teknolojileri Sertifika Programının amaçları arasında paralellik olduğunu ortaya koymuştur. Programda yeralan derslerin genel olarak etkili olduğu ortaya çıkmış ve katılımcıların çoğunluğu sağlanan öğrenci desteğini yeterli bulmuşlardır. Bulgular, katılımcıların programda sağlanan bilgisayar tabanlı iletişimden memnun olduklarını, ancak chat oturumlarının yeterince yararlı olmadığını ortaya koymuştur. Bunlara ek olarak katılımcılar programın geliştirilmesine yönelik önemli önerilerde bulunmuşlardır.

Anahtar Kelimeler: Bilgisayar Tabanlı İletişim, Eşzamanlı İletişim, Eşzamansız İletişim, Öğrenci Algıları, İnternet Tabanlı Eğitim.

To My Parents..

ACKNOWLEDGEMENTS

First and foremost, I express sincere appreciation to my thesis supervisor Asst. Prof. Dr. Zahide Yıldırım for her academic guidance, insight, and encouragement throughout the research. I would like to thank for her sincerity, tolerance, and understanding.

Then, I would also like to express my deepest gratitude to Prof. Dr. Faruk Polat, project coordinator of online ITCPs, and all other instructors in online ITCPs who encouraged and supported in writing of this thesis.

I should also express my appreciation to my department instructors, Prof. Dr. M.Yaşar Özden, Asst. and Prof. Dr. Soner Yıldırım for their invaluable suggestions and comments.

My thanks also go to all the participants who participants in the questionnaires, who willingly gave their time to facilitate the collection of data

I offer my sincere thanks to Hasan Ulusoy, Pelin Arıkan and my other friends for their support and encouragement.

Finally, my deepest thanks are to my parents who supported and motivated me with their never ending patience, tolerance and understanding throughout the study.

TABLE OF CONTENTS

LIST OF TABLES

CHAPTER 1

INTRODUCTION

1.1 Background of the Study

Technology has penetrated into our lives during the last half-century. Across the developing world with technology, profound changes have occurred in various areas such as communication, nature of work, structure of organizations and daily life. In other words, technology is changing how we work, how we learn, how we spend our free time and how we interact with one other. As a result, people need to learn to cope with changes in different aspects of their lives and success depends on keeping up with it through advanced training and lifelong learning. Hanna (1998, Introduction sec, para. 3) claims: "throughout the industrial era, the system has focused upon serving the educational needs of youth to prepare for a lifetime of work. Today it is clear that the future will involve a lifetime of learning in order to work."

With the rising technology improvement, Information and Communication Technologies (ICT) are transforming our society. New mediums of human communication are emerging, which are radios and televisions, computers, and mobile phones. The old barriers of distance and time are being broken down. That brings savings in terms of cost and time, opens the doors for globalization, competitive advantage, and provides growth, and new services. These developments have improved people's vocational and employment prospects and opportunities.

In addition to these, the fast pace of technological change demands a skilled workforce to compete in the global marketplace. However, there are not enough skilled personnel especially in information technology field. For example, in 1999, International Data Corporation (IDC) found that the shortage of IT workers worldwide stood at over one million. Their study predicted that the United States alone would experience intense recruiting problems for about 850,000 IT jobs by 2002. In the same year, the shortage of skilled IT professionals would exceed one million in Europe alone. By 2002, the openings for IT worker positions could exceed one-fourth of 1998's total IT workforce. West Europe estimates a staggering shortfall of 1.7 million IT workers by 2003, of which 400,000 unfilled positions will be in Germany (Chandrasekhar, 2000).

Looking at Turkey's condition, the survey done by Turkish Informatics Foundation stated that 70 thousand of qualified IT workforces are required for the formation of information society (Vural, 1999). In addition, Cisco and International Data Corporation in Turkey forecast in their reports that the number of network specialists' gap will be 12 thousand people in 2002 and 20 thousand people in 2003 (IDC Reports, 2001).

Many developed and developing countries are trying to accelerate the supply of IT workforce to eliminate the current critical shortage and to meet the expected huge demand growth in future. Moreover, we are facing another problem because of rapidly changing profile of human resource in IT field. According to Smerdon (1996), a decade ago a group of experts estimated the half-life of an engineer's technical skills. They defined a half-life, as the length of time it would take for half of everything an engineer knew about his or her field to become obsolete. It takes 7.5 years for mechanical engineers, 5 years for electrical engineers and 2.5 years for software engineers. At such a rapid progress the world is now experiencing, these figures are surely smaller than reality. It is clear that job and career changes come more frequently for today's adults than ever before.

In the 21st century, human capital needs include the requirement for employees to develop their skills, adapt to rapid change in the workplace, and bring innovation into solving problems. Organizations, private sectors and universities are trying to supply the demand for qualified employees in many countries. Technical training, graduate programs and certificate programs are provided in many ways for the students and employees.

One of the effective ways to educate people, especially adults, is through distance education. McIsaac and Gunawardena (1996, Introduction sec, para. 1) mentioned distance education as "Distance education, structured learning in which the student and instructor are separated by time and place, is currently the fastest growing form of domestic and international education". It is suitable for especially working adults who work full-time and seek for continuous education as part-time students and allow them to achieve their goal. According to the Department of Education in U.S.A, distance education programs increased by 72 percent between 1995 and 1998. In 1998, institutions offered a total of 54,000 online education courses, which 1.6 million students enrolled in. In 1995, there were only 53,000 students and 26,000 courses offered. Many sources predict the involvement of over 2,000,000 learners by 2002 (Tulloch, 2000).

Furthermore, according to Knowles's andragogy theory, "adult learners take control of their education, and want the opportunity to learn at their own pace, at times and places compatible with the commitments of family, work and leisure. Also, they demand relevant and applicable coursework and a learning environment that is supportive and collaborative." (Knowles, 1984, p.125). Distance learning encompasses all technologies and supports the pursuit of life-long learning for all. The structure of distance learning gives adults the greatest possible control over the time, place and pace of education.

In addition, instructional delivery methods are changing and improving effectiveness of distance education. Delivery methods can be roughly divided into synchronous or asynchronous types. Synchronous instruction requires the simultaneous participation of all students and instructors. The advantage of

synchronous instruction is that interaction is done in real time. Forms of synchronous delivery include two-way video conferences, telephone conversations and chat sessions. On the other hand, asynchronous instruction does not require the simultaneous participation of all students and instructors. Students do not need to be gathered together in the same location at the same time. In addition, students may arrange their own study time and take or study learning materials according to their schedules. Asynchronous instruction is more flexible than synchronous instruction. Forms of asynchronous delivery include correspondence courses, audiocassette courses, videotaped courses, email, listservs and WWW-based courses.

With the beginning of personal computer technology in the 1980s and developments in communications technology in the 1990s with the Internet, the potential for improving the quality and effectiveness of distance learning has grown. The Internet is becoming a part of society and the most effective method of distributing many types of information. With the Internet, the World Wide Web is a new medium that has expanded rapidly over the past years. It is easily accessible, it supports flexible storage and display options, it provides a simple yet powerful publishing format and a means to incorporate multiple media elements. Therefore, the Internet has become a popular medium of communication and information dissemination. Furthermore, it has been taken as an effective instructional tool of learning by the distance education institutions and with the Internet, distance education is becoming more prominent on the university campus, more and more instructors and students are becoming involved in both the technical and educational aspects of distance education.

1.2 Purpose of the Study

The Internet has experienced a quickly growing expansion into an information network. All kinds of information can be digitized and passed on to millions of people in a few seconds. By providing novelty, it is changing human society. World Wide Web browsers provide a good example of powerful modern Internet facilities. In addition, distance learning with the Internet opens new ways of learning for many people. Now, educational programs and learning materials installed and supported in one place can be used by thousands of people from all over the world and learning via the Internet makes it easier to continue education and create career opportunities for many people.

This type of education first became valid in Turkey in the Middle East Technical University (METU) with the enterprise of METU Computer Engineering Department, technical support of METU Computer Center and collaboration of METU Continuing Education Center. Online Information Technologies Certificate Program (ITCP) is the first one of its kind in Internet Based Education Project. The aim of this program is to contribute to the training of experts in the field of computer technologies in Turkey.

The program is conducted, in the management responsibility of Continuing Education Center and academic responsibility of Department of Computer Engineering, with Turkish course materials prepared by the instructors, who give the courses, from the same department. This certificate program comprises eight courses, which are given in four terms and each term lasts two months. At the end of each term, there are face-to-face lectures for each course and final examinations within the campus of the Middle East Technical University. Those attendants who succeed in the examinations in four terms will deserve to receive the Certificate of Information Technologies. The first group of participants of the certificate program started their education in May 1998 and the fifth group of students of the certificate program finished their education in July 2002. From the first group to fifth group, the programs were improved by changing some of the course materials, courses, instructors, and curriculum.

There has been no research conducted on these programs so far. Therefore, there is a need to investigate perceptions of the participants about the programs to be able to determine the problems that may face. The main purpose of the study is to investigate the perceptions of the 3rd, 4th and 5th programs' participants about online Information Technologies Certificate Program in regard to preferences, course effectiveness, learner support and computer mediated communication.

1.3 Significance of the Study

The information industries are a major source of jobs, economic growth and new business opportunities. Other industries across the economy are also being transformed as the information industries and new information and communications technologies help those industries to improve their competitiveness. As we move into the twenty-first century, our economic, political and social processes will become increasingly knowledge and information based. This will require increased emphasis on the skilled IT worker. One of the ways to educate many people who are mainly adults to cover the need for the skilled IT workers is preparing online programs about computer technology. In the literature, there are many studies about web based courses given in universities or colleges for their students. With this study, the perceptions of participants who attended online certificate program will be examined as one of the first online certificate program in Turkey.

Within the past five years, many institutions and universities have begun offering courses and degrees through the Internet and other distance education technologies. Therefore, there is a good deal of research dealing with distance education. However, Phipps and Merisotis (1999, cited in Picciano, 2001) said that a major shortcoming of the distance learning research to date was the emphasis on student outcomes for individual courses rather than for total academic programs. This study is prepared to examine the total of online certificate program. Therefore, the results of this study will contribute to the literature in this field as the investigation of the whole program.

In addition, in the literature, there are many research studies which focus only one delivery method in distance learning. However, this online certificate program does not use single delivery method. The delivery methods of both asynchronous and synchronous for instruction are used. In other words, the result of this study will provide valuable information to the literature about the course with both asynchronous and synchronous delivery methods.

Furthermore, it is hoped that this study would clarify participants' perceptions about course effectiveness, learner support and computer mediated communication in the 3rd, 4th and 5th ITCPs and consequently use the results for the improvement of the program by making use of the participants' suggestions.

In addition, since this program is the first one of its kinds in Turkey, findings of the research will provide the other online course designers and instructors with set of successes and failures related to course features, learner support and computer mediated communication, enabling them avoid possible similar problems that may arise for their own course.

1.4 Objective of the study

The objectives of the study are:

- To investigate the demographic information of the 3rd, 4th and 5th programs' participants
- To investigate the preferences of the 3rd, 4th and 5th programs' participants about online ITCPs
- To investigate the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of each course in online ITCPs
- To investigate the perceptions of the 3rd, 4th and 5th programs' participants about learner support in online ITCPs
- To investigate the perceptions of the 3rd, 4th and 5th programs' participants about Computer Mediated Communication in online ITCPs

1.5 Definition of Terms

Internet: The Internet is a worldwide system of computer networks - a network of networks in which users at any one computer can, if they have permission, get information from any other computer. It serves as transportation for many things including WWW, FTP, News, email, live video, chat, interactive games, etc.

World Wide Web (WWW): The WWW is the part of the Internet that consists of pages (documents) linked to each other around the world. These pages have pictures, sounds, and more.

Information Technology (IT): Information Technology is the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware (ITT Technical Institute, 2003).

Internet Based Education: Internet based education is a form of distance education in which the course contents are delivered and the interactions are provided by the technologies and methodologies. It allows people to interact with others asynchronously or synchronously in collaborative environments. It provides resource-based environment with individual learning in a flexible way (Jung, 2000).

Learner Support: Learner support is a system that includes instructors or facilitators who help learners with problems they face in Internet-based education.

Computer Mediated Communication: Computer mediated communication is the exchange of information between persons by way of computer networks; this can be all kinds of information, for example text, images, audio, and video.

Synchronous communication: Synchronous communication is communication taking place in real time- like a face-to-face meeting, a telephone call, or a class held at a specific location with instructor and students meeting face-to-face. All participants in the interaction must be present, although not necessarily at the same physical location.

Asynchronous communication: Asynchronous communication is communication taking place at different times or over a certain period of time. It means that it is not real-time based communication. Teachers and/or learners are not tied to a common location or timeline.

CHAPTER 2

REVIEW OF LITERATURE

In this chapter, distance education, Internet-based education, learner support in distance education, computer mediated communication, synchronous and asynchronous communication, and distance education research studies are discussed.

2.1 Distance Education

Distance education has been used as an instructional mode in numerous countries around the world for many years (e.g., Australia, China, India, Norway, United States, and West Africa). A variety of subject is taught, such as, engineering, business, health, natural sciences, education, arts etc. Internationally, there are numerous distance-teaching institutions. Some of the most well-known include Athabasca University (Canada), Everyman's University (Israel), Open Universities (Netherlands), Open University (United Kingdom), University of the Air (Japan), Universidad Nacional de Educacion a Distancia (Spain) and Pennsylvania State, University Dept. of Distance Education (USA).

Distance education is not a new phenomenon. With the development of the postal service in the 19th century, correspondence colleges provided distance education to the students across the country. This trend continued well to the 20th century with the advent of radio, television, and other media that allowed for learning at a distance.

In the last decade, distance education has changed significantly with the use of computer-mediated learning, two-way interactive video, and a variety of other technologies. Before investigating evolution of distance education in detail, the definition of distance education will be analyzed.

2.1.1 Definition of the Distance Education

In the literature, distance education can be called with many concepts and terms which are used interchangeably to describe, such as, open learning, flexible learning, independent studies, distance teaching, distance learning. It is simply defined that a form of education where the learner is in some way separated from the instructor and instruction is delivered with print or electronic communications media to the learners. These are common characteristics of distance education in many definitions. A few of varied definitions are listed below.

According to Moore (1973), distance teaching may be defined as the family of instructional methods in which the teaching behaviors are executed apart from the learning behaviors, including those that in a contiguous situation would be performed in the learner's presence so that communication between the teacher and the learner must be facilitated by print, electronic, mechanical or other devices (cited in Meng-Ching, 1995).

In 1979, UNESCO defined distance education as:

> Education conducted through the postal services, radio, television, telephone or newspaper, without face-to-face contact between teacher and learner. Teaching is done by specially prepared material transmitted to individuals or learning groups. Learners' progress is monitored through written or taped exercises, sent to the teacher, who corrects them and returns to learners with criticism and advice (Keegan, 1990, p.44).

Actually, according to Garrison (1989), the term distance education was popularized in 1982 when the International Council for Correspondence

Education changed its name to the International Council for Distance Education. This was a response to the many emerging teaching and learning patterns based on technology. (cited in Hubbard & Mortensen,1997).

Distance education is different from the traditional on-campus study in the way of features. Keegan (1990, p 44) identified five main elements to compose a comprehensive definition of distance education in his book:

1. The quasi-permanent separation of teacher and learner throughout the length of the learning process (this distinguishes it from conventional face-to-face education).
2. The influence of an educational organization both in the planning and preparation of learning materials and in the provision of student support services (this distinguishes it from private study and teach-yourself programs).
3. The use of technical media -print, audio, video or computer- to unite teacher and learner and carry the content of the course.
4. The provision of two-way communication so that the student may benefit from or even initiate dialogue (this distinguishes it from other uses of technology in education).
5. The quasi-permanent absence of the learning group throughout the length of the learning process so that people are usually taught as individuals and not in groups, with the possibility of occasional meetings for both didactic and socialization purposes.

The last component of Keegan's definition was no longer applicable to most two-way interactive situations. Group instruction in classrooms via distance education was a normal application of distance education and also Garrison and Shale (1987 cited in Simonson, Smaldino, & Albright 2000, p.21) argued that, in the light of advances in distance education delivery technologies, Keegan’s definition was too narrow and did not correspond to the existing reality as well as to future possibilities. They offered the following three criteria for characterizing the distance education process:

1. Distance education implies that the majority of educational communication between (among) teacher and student(s) occurs noncontiguously.
2. Distance education must involve two-way communication between (among) teacher and student(s) for the purpose of facilitating and supporting the educational process.
3. Distance education uses technology to mediate the necessary two-way communication.

Moore's first definition has served as a framework for distance education. While the definition has been modified a number of times, it continues to retain many of its original constructs, including electronically mediated communication between teacher and student. Twenty-five years later, Moore and Kearsley (1996, p.2) wrote the following definition of distance education that is often cited in the literature for the discipline:

> Distance education is planned learning that normally occurs in a different place from teaching and as a result requires special techniques of course design, special instructional techniques, special methods of communication by electronic and other technology, as well as special organizational and administrative arrangements.

As new technologies developed, distance instruction was delivered through such media as audiotape, videotape, radio and television broadcasting, and satellite transmission. Peters (1993) emphasized the role of technology, defining distance education as:

> Distance teaching/education is a method of imparting knowledge, skills and attitudes which is rationalized by the application of division of labor and organizational principles as well as by the extensive use of technical media, especially for the purpose of reproducing high quality teaching material which makes it possible to instruct the great numbers of students at the same time wherever they live. It is an industrialized form of teaching and learning (cited in Simonson, Smaldino, and Albright 2000, p.37)

According to Mortensen (1995), current application of the term distance education trends to refer to real-time interactive systems. Recently, approaches such as tele-courses (e.g. delivered by television) and correspondence courses tend to be referred to by those names. That is, the delivery system is being used to define the type of distance education. This also seems to be the case as Internet distribution increases. It is common to hear them referred to as "Internet courses" (cited in Hubbard & Mortensen, 1997).

2.1.2 History of the Distance Education

Distance education seems a new idea to most educators of today. However, the concepts that form the basis of distance education are more than a century old. Certainly, there has been a growth and change in distance education recently, but it is the long traditions of the field that continue to give it direction for the future.

One way of looking at the history and successive developments in distance education has been to describe them as belonging to different generations. Garrison (1985) and Nipper (1989) were among the first to use this term to describe three phases of distance education, which were linked historically to the development of production, distribution and communication technologies (cited in IITE Analytical Survey, 2000).

The first generation used correspondence teaching based on printed and written material. According to Picciano (2001, p.11), although it was difficult to say exactly when distance learning via correspondence began, “Tifflin and Rajasingham describe the epistles of Paul the Apostle as a form of religious correspondence education and letter written on papyrus by scribes were delivered by messengers to the early Christian communities to promulgate and explain religious dogma”.

In 1840, England’s newly established penny post allowed Isaac Pitman to offer the first correspondence course. By the 1870s, correspondence courses gained international popularity. Picciano (2001, p.12) stated that “most of the early

pioneering correspondence programs struggled but some, such as Hermonds in Sweden in 1886, International Correspondence Schools in 1891, and the Calvert School in Baltimore in 1906 went on to become quite successful". By 1930s, hundreds of correspondence programs were established throughout the world with help of increasing railroad industry.

The second generation was based on broadcast media, such as television and radio, as well as on distribution of video and audiocassettes. The invention of radio in the 1920's saw the beginning of radio-led courses consisting of a series of talks and also occasionally a set book or other printed materials and local study groups were included. Schlosser and Simonson (2002) estimated that at least 176 radio stations were established at educational institutions during that time. However, most of these were replaced in later years as television and video technologies became popular and from the 1950's, TV-led courses have been extensively used. With the setting up of the Open University of the UK in 1969, this was the first time that a deliberately integrated multiple media approach had been used for distance education. However, the dominant medium was still print. In that days, The Open University developed large quantities of high-quality; specially designed distance learning materials. In addition, 1970s and 1980s saw an investment in newer television delivery technologies, namely cable, satellite communications, and fiber optics.

The third generation of distance education used information and communications technology as its basis, offering two-way communication in various forms (text, graphics, sound, moving pictures) either synchronous ('at the same time' as in videoconferencing and audio graphics) or asynchronous ('not at the same time' as in electronic mail, use of the Internet and computer conferencing).

During the 1990s, a vast array of two-way distance learning programs emerged as an assortment of hardware and communication tools became available, including: local area networks (LANs); Internet and intranets; telephone-based audio conferencing; facsimile transmission; cable television; videoconferencing

with one- or two-way video, fiber optics, satellite, microwave, closed circuit or low-power television (Fleischman, 1998).

The recent developments of the worldwide web, digital satellite technology, and new applications of virtual reality to build simulated learning environments are predicted to have particularly dramatic effects upon learning environments at all levels. Universities are experimenting with improving accessibility to existing programs, designing new programs to take advantage of these emerging technologies, and are marketing their programs to new audiences and in new ways (Hanna, 1998). Using World Wide Web, text-based e-mail, and group software, asynchronous learning networks (ALN) are considered the future distance learning delivery systems, especially when digital video can be delivered inexpensively over the Internet.

In addition, computer networks are a convenient way to distribute course materials to students around the world. Many faculty members now use the convenient user interface of the World Wide Web to make course materials available to their students. Schlosser and Simonson (2002) stated that The British Open University, Fern Universität of Germany, and the University of Twente in the Netherlands were some of the leading providers of on-line courses in Europe. In the United States, the American Open University, Nova Southeastern University, and the University of Phoenix have been traditional leaders in providing distance education. They, along with many other universities, are now offering hundreds of courses online.

2.1.3 History of the Distance Education in Turkey

Distance education has been employed in the Turkish Education System during three prominent periods: 1927-1955, 1956-1981 and after 1980s'. These periods were characterized by the following issues; intensive debate on distance education as a concept, employment of distance education at secondary and higher education levels, system-shut down, foundation of Council for Higher

Education (CHE), re-employment of distance education in higher education, and later in secondary education(Agaoglu, Imer, & Kurubacak, 2002).

In 1927, in a meeting where national education problems were being discussed, a distance education model, “correspondence course” was offered to increase national literacy (Alkan, 1987 cited in Agaoglu, Imer, Kurubacak, 2002). From 1935 to 1955, distance education was brought to the agenda of public opinion from time to time but no action was taken. Therefore, the period between 1927 and 1955 can be regarded as the period of argumentation for distance education as a concept.

In 1958, Correspondence Course Center (CCC) was founded within the Ministry of Education (MOE). In 1961, CCC offered correspondence courses such as technical knowledge courses for adults and preparation courses for those taking external exams. Another application for distance education in Turkey during this period was the “School Radio” that has been in practice since 1963. The program was for primary school students and was prepared by Ankara Provicial Radio. Later on in 1975 and 1978 draft law proposed the establishment of "Open University", however it was not accepted. In other words, in Turkey, "Education Through Letters" (called in Turkish as being YAY-KUR) application started as a correspondence education, as an alternative to the traditional education however required efficiency and success was not achieved. (Odabasi, Kaya, 1998 cited in Ozkul 2000).

In 1982, Anadolu University began distance higher education in the preserve of its Open Education Faculty (OEF), OEF started programs in Business Administration and Economics with a student enrollment of 29,479 for the 1982-1983 academic year (Ozkul, 2000). Teaching resources in these programs were printed material, broadcasting and academic counseling. Printed materials were mainly developed by faculty members, but co-authors from other universities assisted in writing as well.

In the 1982-1983 academic year, 20 minutes television programs were broadcasted weekly for each course in the Business Administration and Economics programs. One year later, 30 minute radio programs started, with English being the first course offered. Later years, OEF had a total of 650,000 students regarding the 1998-1999 academic year. It offered education in 18 different programs. Currently, four main teaching resources are utilized; radio-television programs, printed material, academic counseling and computer assisted instruction which started in 1995. The number of television programs has also increased following the increase in the number of courses (Agaoglu, Imer, and Kurubacak, 2002).

In the recent years, some universities started to employ distance education technologies to support conventional teaching. In 1996, Bilkent University had initiated some synchronous distance education courses via satellite. Istanbul Technical University established remote classrooms via a microwave link connecting two campuses that were in different locations in Istanbul. Middle East Technical University (METU) has started experimental distance education course via the Internet in 1997. Following years, METU has been experiencing an Internet Based Distance Learning certificate programs (ide_a which was investigated in this study), and Online M.S. degree program in Informatics (ion). A few numbers of lecturers at METU have started to support their courses for the (internal) students with web pages (Yazıcı, Altas, Demiray, 2001). Furthermore, Internet based education_asynchronous and synchronous program (ide_as) was prepared to give instruction technologies certificate to the participants in 1999 in METU (IDE_AS, 1999).

In addition, Electronic Master of Business (e-mba) which started in November 2000 was a traditional MBA program adapted to distance learning techniques and principles in İstanbul Bilgi University. Furthermore, one of the other distance education projects were started in July 2000 in Sakarya University and online learning was given to the about 2000 undergraduate university student in each 2001-2002 fall and spring semesters. Also, in these days, two international distance education symposiums were held in 1996 and 1998 respectively.

One of the important factors that affect the universities to give web based courses is improving technical infrastructure. Technical infrastructure, The National Academic Network (ULAK-NET), consists of the national high-speed backbone and the fast node connections. The users of ULAK-NET are the universities (state and foundation owned), R&D divisions and information and documentation centers of state and private organizations and prominent libraries around Turkey. ULAK-NET is an initiative of the Scientific and Technical Research Council of Turkey (TÜBİTAK) and strongly backed by Turkish Telecom. The Council of Higher Education has been preparing rules and regulations for the distance education based on computer and communication technologies (Ozkul, 2000).

2.1.4 Distance Education Theories

Many theoretical perspectives on distance education have been presented during the last twenty years. Keegan (1990, p.30) classified theories of distance education into three groups:

- Theories of independence and autonomy
- Theories of industrialization, and
- Theories of interaction and communication

Theories of autonomy and independence: Two people, Moore and Wedemeyer, are well known about this theory (Simonson, Smaldino, and Albright, 2000). Formulated in the early 1970s, Moore's theory of distance education, which he called "independent study", was a classification method for distance education programs. Moore's inductive analysis of descriptions of two thousand instructional programs led to the development of a theory on dialogue, structure, and autonomy. Moore perceived dialogue as interaction between learner and instructor, structure as certain characteristics of course design, and autonomy as learner independence. He argued that distance education organizations should ideally give students maximum independence with regard to choice of aims, objectives, study methods, and learning activities; study pace and progression;

and evaluation. In addition, Wedemeyer noted four elements of every teaching-learning situation: a teacher, a learner or learners, communications systems or mode, and something to be taught or learned. He proposed a reorganization of these elements that would accommodate physical space and allow greater learner freedom. Key to the success of distance education was the development of the relationship between student and teacher.

Theories of industrialization: In a major treatise on education, Otto Peters of Germany developed a view of distance education as an industrialized form of teaching and learning. Peters's applications of industrial theory led him to conclude that the structure of distance teaching was determined to a considerable degree by the principles of industrialization, particularly by those of rationalization, division of labor, and mass production; the teaching process was gradually restructured through increasing mechanization and mass production. These changed account for the emergence of the following structural propositions (Simonson, Smaldino, & Albright, 2000):

- The development of distance study courses is just as important as the preparatory work taking place prior to the production process.
- The effectiveness of the teaching process is particularly dependent on planning and organization.
- Courses must be formalized and expectations from students standardized.
- The teaching process is largely objectified.
- The functions of academics teaching at a distance have changed considerably vis-a-vis university teachers in conventional teaching.
- Distance study can only be economical with a concentration of the available resources and a centralized administration.

Theories of interaction and communication: According to Simonson, Smaldino, and Albright (2000, p.33), Holmberg's theory of distance education, what he called guided didactic conservation, falled into the general category of communication. He formed his theory:

> Distance teaching will support student motivation, promote learning pleasure and make the study relevant to the individual learner and his/her needs, creating feelings of rapport between the learner and distance-education institution (its tutors, counselors, etc.), facilitating access to course contents, engaging the learner in activities, discussions and decisions and generally catering for helpful real and simulated communication to and from the learner.

In his theory of guided didactic conversation, he viewed the distance-study course and its non-contiguous communication style as instruments of a conversation which like interaction between the students on the one hand and the tutor counsel of the supporting organization, administering the study on the other. Constant interaction (conversation) between the supporting organizations (authors, tutors, counselors) was both simulated and real: simulated through the students' interaction with the pre-produced course materials and real through written and/or telephone interaction with their tutors and counselors.

2.2 Internet-Based Education

The Internet is possibly the most transformative technology in history, reshaping business, media, entertainment, and society in surprising ways. Although it is very powerful, it is just now being tapped to transform education. In the last few years, as the Internet became more prevalent, interact-based distance learning courses became popular and many higher education institutions are adding distance learning courses to their course offerings for economic reasons (Phipps & Merisotis, 1999).

Internet-based distance learning offers such advantages as convenient access, flexibility, equal student participation potential, student/instructor collaboration, and active learning opportunities for the learners, especially adults. It could be said that they have can work at their own pace and at locations they are able to control. In addition, Bennett (2001) explained that Internet-based distance learning offers instructors more flexibility as well. They may choose the time and place from which they will teach their course. He noted that one of the major strengths of Internet-based distance learning is the collaboration between the instructor and students. Bulletin boards, chat rooms, electronic mail, and white boards all force students to communicate with their instructor and each other.

Moreover, roles of students and instructors changed in this environment compared with traditional environments. Hofmann (2002) stated that students are active learners and responsible for their own learning in Internet-based instruction. The instructor acts as a facilitator who guides students through the course and offers advice and help when needs. Internet-based distance learning offers a variety of media that enable students with different learning styles to learn effectively.

Students and faculties have mainly positive attitude about distance education. For example, One of the study, which lasted six years, a team of investigators at the University of Central Florida's Research Initiative for Teaching Effectiveness (RITE) examined student and faculty issues in the online environment, focusing on maintaining a sustainable and objective evaluation, Dziuban and Moskal (2001) found that students reported high satisfaction with Web courses, both fully online classes and courses that feature a combination of face-to-face and online instruction.

Furthermore, it is mentioned that the Internet environment uses as a supportive tool or web based courses brings new facilities to the instructors and students. However, using on-line instruction is not an easy task therefore there exist some problems about distance education. Studies have acknowledged a number of obstacles faculty are confronted with when delivering on-line instruction. Negative attitudes of faculty are also apparent when the issues of time and

support are factored into the development of WBI (Innovations in Distance Education, 1997), and some of the most frequently mentioned barriers were: decreased live, face-to-face interaction with students and the lack of support and assistance in planning and delivering an on-line course (Berge, 1998).

As a result, one can conclude that even if using Internet in education has some difficulties, Internet-based distance learning brings many advantages and facilities to the instructors and students.

2.2.1 Principles and Guidelines for Quality Distance Education

Distance learning courses should be carefully planned to meet the needs of students. The following principles and guidelines are intended to serve for identifying and evaluating distance learning courses in the literature.

In 1987, the American Association of Higher Education Bulletin published "Seven Principles of Good Practice in Undergraduate Education", the product of a review and summary of decades of research on teaching and learning in undergraduate education. These hallmarks of quality education included (cited in Graham, Cagiltay, Lim, Craner, & Duffy, 2001):

1. Good practice encourages contacts between students and faculty.
2. Good practice develops reciprocity and cooperation among students.
3. Good practice uses active learning techniques.
4. Good practice gives prompt feedback.
5. Good practice emphasizes time on task.
6. Good practice communicates high expectations.
7. Good practice respects diverse talents and ways of learning.

Distance education, especially online education, has the potential to achieve all of these practices (just as face to face education has the same potential), and in some instances fulfills them better than is possible with traditional education. For example, asynchronous communication provides opportunities for interaction among faculty, students, and peers that is not possible when adult learners have

to be busy after class to meet work or family obligations. (Chickering and Ehrmann, 1996).

In addition, Moore and Kearsley (1996, p. 122-123) have identified 12 key general design principles for successful distance education programs:

- good structure — the organization of the course and materials should be well-defined to the participants
- clear objectives
- small units
- planned participation to increase types of interaction
- completeness
- repetition of important ideas
- synthesis
- stimulation
- variety/multi-media approach
- open-ended
- feedback
- continuous evaluation.

Hillesheim (1998, cited in McDonald, 2002) distinguished three dimensions to quality standards: (1) managerial quality/organizational criteria (eg., leadership and record keeping); (2) functional quality/technological criteria (eg., student support via process teams); and (3) ethical quality/instructional criteria (eg., the relationship between students and faculty, faculty evaluation, and student and faculty empowerment). Achievement of goals in these two dimensions was necessary but not sufficient for quality education. Much more depended upon achievement of Hillesheim's "third dimension goals" such as establishment of authentic relationships and empowerment of students and faculty.

In addition, technology criteria were not considered important quality measures for distance education programs until the 1990's. According to Ehrmann (1995), Institutional commitment to the maintenance of the technology infrastructure and technology support for faculty and students were also now common criteria for

quality distance education. Ehrmann stated that institutional policies concerning learning resources and technology maintained necessitate giving high priority to user-friendly hardware, software, and communication tools that help faculty and students use technologies efficiently and effectively.

Similar principles may be found in connection with the world's largest experience in online distance education, the Open Learning experiment in the U.K. In reviewing this experience, Mayes and Banks (1998, cited in Garson, 1999) concluded that three factors combine to maintain quality and integrity of Open Learning courses: (1) common, structured course materials; (2) open assessment using a competency-based methodology; and (3) an extensive support and monitoring network.

In November 1995, the Distance Education Consortium (ADEC), comprised of 46 universities and colleges, launched a multimedia program to enhance the quality of distance education. From this consortium, the identification of quality distance education factors that were deemed appropriate for all types of distance education technologies were stated. They included:

- knowing the learners;
- creating confident and committed faculty;
- designing for active and effective learning;
- supporting the needs of learners;
- maintaining the technical infrastructure;
- sustaining administrative commitment
- evaluating for continuous improvement.

These factors are standards that help us recognize and define quality distance education programs. Their presence and their absence impact the quality of what we do in distance learning. (Gibson & Gibson, 1996).

Effective Course Design

A number of research studies have been conducted around the issues of designing course material for distance education. The main considerations are mentioned in the literature to the elements of course design such as interactivity, feedback, instructional design, student support, and media selection.

Whether interactivity is occurring in a traditional classroom or in a distance education setting, the learner's perception and satisfaction about interactivity are key determinants of effectiveness and quality. According to Hackman and Walker (1990 cited in McIsaac & Gunawardena, 1996), interactivity and user control have been found to best suit instructional needs in two way distance education systems.

One of the most frequently concerns in courses design for distance learners is providing adequate feedback to the learner. McCleary and Egan (1989 cited in McIsaac & Gunawardena 1996) examined course design and found that their second and third courses received higher ratings as a result of improving three elements of course design, one of which was feedback. Feedback is important at all levels and also immediate feedback is more desirable.

A thoughtful instructional design is even more critical in distance education courses than traditional courses. Students need to see an order and process to their learning. For an online student, such order must be clearer. More importantly, the instructional design shows the motivations and philosophy of the instructor. Unlike students faced and interacted with in a traditional setting, distance education students see the instructors only in their work. Whatever the approach, instructional design for web-based courses needs to be done carefully. It means that web-based courses lacking face-to-face interaction must be designed carefully (Bernard, 1997). In other words, web-based courses should maximizes learner control to be effective with appropriate design approach that recognizes the need for a structure.

In addition, when considering the various channels of communication for distance educational purposes, the strengths and limitations of each available ones can be analyzed. Decisions can be made concerning the better media through which to present each instructional goal or learning activity. Actually, Dekkers, Warner and Wilkinson (1990 cited in Collins and Berge 1994) stated that delivery of instruction was usually more effective when more than one medium was used.

2.2.2 Who are distance learners?

Learners throughout the world are demanding educational opportunities in an "anytime and anywhere" format, and institutions are responding by devoting resources to develop online distance learning. Therefore, online learning has rapidly become a popular method of education for traditional and non-traditional students. However, the students who participate in distance education tend to be different from conventional students.

The distance education literature confirms this view of distance education students as adult learners. Moore (1985 cited in Wallace 1996) comments: "Most distance education is concerned with the education of adults and it seems fairly obvious that our research plans should be informed by the theories and research about learning in adulthood, adult development, program planning, instruction and evaluation in adult education" (p.36). Also, demographic data available from several large national studies of adults studying for college credit showed that the majority of students are female, married, employed full time, and older than typical college-age students. The implications of these demographic characteristics were that many of these students have other responsibilities outside of school (e.g., family, job) that place demands or constraints on their time and their level of commitment to school (Hugh & Forest, 1997).

Furthermore, online learning environments have the potential to support a learner-centered paradigm and learners assume a more active role in the learning process. For instance, learners often initiate communication with their instructors

through the regular use of electronic mail and other computer-mediated communication tools when assignment clarification is needed or when content questions are raised about a course topic. In addition, learners can assume control of their learning experience by discussion groups with peers in an online course. Increased responsibility and accountability for learning were required of online learners (McGrath, 1998). Furthermore, according to Hedberg, Brown, and Arrighi (1997 cited in Dringusb, 1999), they become active seekers and producers of information anytime and from any location, by sharing information with or retrieving information from various resources such as instructors, other students, electronic libraries and databases, and other internal and external information resources.

Online learners are different from traditional learners. In addition, online learners have special needs that must be supported. Sarah (2001) advised developing a support network for distance learning students, either in person or electronically, to increase motivation and completion:

- Finding out about the course you are considering.
- Obtaining funding
- Establishing a support network
- Understanding the course requirements
- Planning your study time
- Time management
- Getting used to a different quality of support: feeling part of the course
- Getting used to a different type of academic feedback
- Seeking help
- Evaluating the course
- Maintaining motivation
- Informing your employer or your appraiser about your progress.

2.3 Learner Support in Distance Education

The dominant feature of distance education is the physical and often temporal distance which separates the teacher and learner. Because distance students are often placed in a situation in which neither teachers nor fellow students are physically present to clarify, discuss, or provide feedback, effective distance education requires learner support system (Dillon & Gunawardena, 1992). According to Garrison and Baynton (1987 cited in McLoughlin, 2002), they stated that the learner support system includes the resources that the learner can access in order to engage in the learning process (e.g. learning materials, library, teacher/facilitator), and resources, which relate to the mediation of the communication process (e.g. media and technology).

One important means of analyzing the effectiveness of the teaching-learning experience in a distance education system is through the analysis of the learner support system. It can be categorized into the following four areas: pedagogical, social, managerial, and technical. These four areas are discussed by Berge(1995):

Pedagogical (intellectual; task): One of the most important roles of online discussion moderators/instructors makes their duties as an educational facilitator. For examples, he/she uses questions and investigates for student responses that focus discussions on critical concepts, principles and skills.

Social: Creating a friendly and social environment is also essential for successful moderators/instructors. This suggests "promoting human relationships, developing group cohesiveness, maintaining the group as a unit, and in other ways helping members to work together in a mutual cause," are all significant to success of any conferencing activities.

Managerial (organizational; administrative): This role involves setting the agenda for the conference or chats such as, the objectives of the discussion, the timetable, and procedural rules. Managing the interactions with leadership and direction is also important for the successful conferencing.

Technical: The moderators/instructors must make participants comfortable with the system and the software. The goal of them is not to teach technology. Especially, the goal of the instructors is to use it to teach something.

These four areas are necessary conditions for effective learning support systems. Also, the important person in the learning support systems is instructors who give courses over the Internet. He/she has many different responsibilities while giving courses. Some of them are listed below.

2.3.1 The role of the online instructor/facilitator

The facilitator plays an important role in developing and maintaining an online program. Often, the facilitator is also the designer and monitor of the online course. In online learning, this role is even more critical, as the instructors has to overcome potential barriers caused by technology, time, and place and create an optimal environment for achieving educational goals.

According to LaMonica (2000), if it can't be assumed that all students in a Web-based course have wanted qualities for a distance learner, then the role of the instructor becomes more important. There has been much written paper on instructor effectiveness in a Web-based environment. A veritable list of best practices can be generated:

- state expectations of students and the course clearly and early
- structure content so that it is easy to follow
- provide regular feedback and guidance to the students
- provide an opportunity for students to give feedback regarding learning and course progress
- strive for participation by all students
- promote collaborative learning

Moreover, some of the faculty and administrators believed that the online classroom was no different from the face-to face classroom and that approaches used face-to-face will work online. Many further believed that all that was needed to successfully teach online is converting the course material. However, many instructors who received positive evaluations from students in a traditional classroom nevertheless find difficulty in adapting their teaching methods to a distance learning format. Palloff and Pratt (1999) stated that the shift to online learning had enormous challenges to instructors and their institutions.

In addition, according to Clay (1999), some common mistakes of new distance instructors are:

- Using technologies wrongly. For example, instructors often put power point slides on Internet courses when text alone would accomplish the same goal. Graphics, audio, or video without a real purpose also result in frustration and a lack of learning for students.
- Putting the textbook online. The purpose of an online course is not to replace the textbook. The Internet should be used as a means of interaction and resource sharing.
- Failing to develop structure and clear requirements. In order for students to participate, they must receive clear expectations from their instructors. For example, saying "every student must post to the bulletin board at least twice per week," works better than saying "be sure to use the bulletin board for interaction."
- Not taking time to learn the technology. It means that students are apt to use technology effectively when instructors have the confidence to answer most of their questions and understand their concerns.
- Failing to interact with students and follow up regularly. Students feel more connected with instructors who participate regularly, even daily, in bulletin board discussions.

As we can comment that the roles of the online instructor are more difficult and they are more careful in distance teaching settings.

2.4 Computer Mediated Communication (CMC)

Computer mediated communication (CMC) is simply defined by Paulsen (1997, p.3) as "transmission and reception of messages using computers as input, storage, output, and routing devices". It has been implemented by means of e-mail, news-groups, listservs, online chats, bulletin boards, computer conferencing, and streaming video and audio. The factors that distinguish CMC from other media include: (a) its capability for use in both synchronous and asynchronous, (b) its ability to enable open interaction between all participants, and (c) its adaptability to the individual learning needs and schedules of students (Harasim, 1996 cited in Sutton, 2001).

In addition, CMC is rapidly becoming a common educational tool in the last years. This increase in use of digital processing and communication technologies has made educator's understanding of the psychology of the learning process in this new environment critical (Romiszowski & Mason, 1996 cited in Sutton, 2001).

In this new environment, all types of interactions are supplied to the instructors and students to better learning and teaching. There exist some kinds of interactions. According to Moore and Kearsley (1996), they identified three types of interactions. They are student-content interaction, student-teacher interaction, and student-student interaction. In addition, Vrasidas (2000) stated the fourth kind of interaction which is learner and interface interaction. This fundamental distinction provided a basis for analyzing the relative significance of different interaction in an education program.

Furthermore, Brush and Uden (2000) stated that current trends in educational theory, based largely on the work of pioneers such as Dewey and Vygotsky, make the following assumptions about learning;

- Learning is a process of knowledge construction.
- Learning is reflective and builds on the learner's existing knowledge.
- Learning benefits from multiple views of a subject area.
- Learning is facilitated by authentic activity relevant to the situation in which it is used.
- Learning is affected as much by motivational issues as by cognitive issues.
- Learning is collaborative, with meaning negotiated from multiple perspectives

It is seen that learning is a social process and it is not only active but also interactive. Therefore, collaborative learning is strongly favored by many educators to produce graduates skilled in teamwork and to explore constructivist approaches to learning.

In addition, Klemm (1998) from Texas A&M University recommended following eight guidelines to create a strong collaborative learning environment in the course discussion board. These methods increased both the quality and quantity of student participation.

Require participation. Don't let it be optional: Participation is more important in the online discussions. The students are said that they must post x-number of items each week or for each topic. Although critics will say that this approach does nothing to ensure quality of input, it at least gets the students engaged, and once they get caught up in the activity, so now they are on display.

Form learning teams: The advantages of cooperative or collaborative learning are that there exist many documents which can be reached and also with bonding learning teams, each student in the group can share what he/she has done.

Make the activity interesting: If it is a discussion topic, make it one that students have a reason to get engaged in. It might even be a good idea to let the students create some of the topics, especially if you provide an overall academic framework to guide them where you want them to go.

Don't settle for just opinions: Everybody has opinions. There can be said many opinions in online discussion, so teachers should insist that opinions alone are not sufficient. They must be supported with data and rational discourse and even re-examined in light of what others in the online group are thinking.

Structure the activity: There exist some guideposts in conference to help students think of things to say that are academically meaningful. Choice of topics has a great deal of influence here. Activities should be created, and these are best performed in a structured way.

Require a hand-in assignment (deliverable): If it is possible, students make something in conference, besides just express ideas and opinions. They should produce a deliverable from the conference. Such a deliverable can include idea generation, plans, designs, proposals, case studies, problem solution, reports, portfolios or role playing, etc.

Know what you are looking for and involve yourself to help make it happen: Teachers should know what quality work is in conference and should intervene as the work is being developed to guide students in the right direction.

Peer grading: Students should be informed at the beginning of the conference that at the end of the activity they will be asked to rates each other on the value of each person's contribution. This can be a powerful incentive for students to do quality work in the conference.

In brief, for instruction through CMC to be effective, it must have a social component and allow students to share ideas and develop their own understanding of the information presented. In other words, learning is predominantly a social process.

2.5 Synchronous and Asynchronous Communication

Instructional communication methods are changing and improving effectiveness of distance education. These methods can be divided into synchronous and asynchronous communications. Synchronous communication occurs in real time like a face to-face meeting (e.g., a class held at a specific location with instructor and students meeting face-to-face). All participants in the interaction must be present, although not necessarily at the same physical location (e.g., if a class were televised and broadcast live to other locations). Asynchronous communication is in some way technologically mediated and is not dependent upon teachers and students being present together at a specific time to conduct learning/teaching activities. Using asynchronous communication students can work at their own convenience when and where they want, and from a pedagogical point of view, students can also control the pacing of instruction.

Internet-based communication provides both synchronous and asynchronous environments for collaboration. Synchronous communication (such as chat) allows interaction to occur at the same time among learners, as in classroom discussions: but learners in the Internet environment use a keyboard to type messages. Local Internet accounts enable learners to engage in collaborative chat sessions with distant peers, expanding the collaborative environment from a single classroom to classrooms around the world. Asynchronous communication (such as mailing lists) allows interaction to occur at different times and locations between two or more learners. Learners need not be present to receive information, and may communicate when ready. Learning occurring as a result of group interaction may take place in a virtual community and may be adjusted to student need, schedule and educational goals. Both of these forms of Internet-based communication expand learners' access to information, resources, and collaboration, and may increase learners' attitude toward collaboration as well as achievement performance.

By its synchronous(real-time) and asynchronous (time-delayed) feature CMC makes the classroom virtually open at any time of the day or night, 24 hours a day, 7 days a week. Its time independence makes it an important feature of

cooperative group work and cooperative learning (McIsaac and Gunawardena, 1996).

In addition, there are many distance teaching programs that are entirely asynchronous. For example, some programs use print plus computer conferencing, and others may use the Web for both course delivery and interaction. There are also some programs that are (almost) entirely synchronous. For example, videoconferencing might be used for delivery and interaction. However, the trend is very much towards combining synchronous and asynchronous media in an attempt to take the advantages of both modes. The various combinations of media use and the amount of interactions included are almost as varied as the number of institutions providing distance education (Chen, 1998). In other words, with distance education technology moving toward multi-media systems, it integrates a combination of technologies both synchronous and asynchronous (McIsaac & Gunawardena, 1996).

In addition, it is not easy task to combine synchronous and asynchronous technologies in distance learning. According to Parker (1997), students in traditional settings can easily interact with their instructors and peers, these same types of interactions must be carefully planned and structured by teachers of distance education. Also, choosing appropriate tools for communication in online environment is another issue to discuss. Now, some of the synchronous and asynchronous tools are analyzed below.

2.5.1 Synchronous and Asynchronous Communication Tools

The Internet provides several effective communication tools, including e-mail, discussion groups, chat services, MUDs and MOOs and video conferencing. These tools can also be used in distance learning as well. In this study, e-mail, online forum, and chat are discussed. The others are beyond the scope of this study.

E-mail

The Internet is a new technology which is now popularly adopted in education, commerce, and government. The Internet demonstrates its potential to influence the educational system of schools. Electronic mail (E-Mail) is one of the functions of the Internet, which is well known currently. It uses computer text-processing and communication tools to provide a high-speed information exchange service. The e-mail software on a computer system enables one computer user to communicate with another user or group of users by moving text and pictures from one computer mailbox to another. E-mail does not require users to be logged on to the computer system at the same time, it means that communication is asynchronous.

This tool, e-mail, has been used in education because of providing many facilities recently. According to Delaney and Krumme (1995), it may be used as a substitute for in-class handouts, time-consuming discussion of class-logistics, faculty office hours, small-group meetings, telephone calls or extra student or faculty trips to campus. The benefits appeared to be obvious: savings in time and money and a potentially more focused learning environment.

In addition, electronic mail can enhance communications between students and faculty, among students and between students and class-related resource sites on or off-campus, such as librarians or other information providers for student projects (D'souza, 1992 cited in Johnson, and Huff, 2000). He listed the following potential educational applications of e-mail: (a) replying to queries and requests from students with regard to course content; (b) providing advice and guidance; (c) helping students to solve problems in understanding the subject matter of a course; (d) serving as a medium of transmission for sending in homeworks and returning test results; (e) discussing projects and work with a tutor; (f) bringing students together in accordance with their interests and needs; and (g) encouraging team projects and setting up self-help groups.

Furthermore, e-mail will become a useful supplement to their teaching environment. For example, Poling (1994) said that there are several points which indicate that using e-mail is an effective method of improving teaching and learning quality. For example, it can give students chances to express what they think, it was an efficient way for distributing assignments to students and also direct communication to a particular student is also a good function of e-mail. Thus, it was a supplementary to the learning and teaching environment.

Online Forum

Online Forums are also another asynchronous communication tools where people can post messages, share solutions about a problem, debate ideas and read about topics of interest. An important aspect is to divide the forum in different themes and the learners read only what is interesting for them, and forum system saves all topics that are put in it allowing for the learner access information later. This tool can develop synthesis and evaluation skills in learners because they don't need to answer immediately, he/she can have more time to think about a subject and express his/her ideas about it.

For example, Rossman (1999) analyzed more than 3000 course evaluation documents from 154 WBI courses and found that learners seemed to learn much from the responses of other learners; that learners do not like it when other learners did not keep posting requirements; that learners prefer discussion forums with open and honest dialog.

Chat *(Internet Relay Chat)*

Computer-mediated communication has created new opportunities for real-time "chatting" among geographically remote individuals sitting at their in front of computer. Chat which is the term refers to a room-style environment where many people can gather as a group and talk to one another.

In addition, computer conferencing offers an effective and efficient means of providing information, generating ideas, and communicating among learners and instructor in an academic setting. An important educational tool, computer conferencing supports active, self-directed learning through a structure that is easily modified to fit different needs of learners. It affords a relevant mechanism that allows for collaborative learning in environments where learners construct understanding through exploration rather than being taught specific knowledge (Winn, 1996 cited in Murphy, Drabier, Epps 1998).

There are many CMC programs that combine characteristics of both written and oral language. People type their messages, and the text of these messages appears on the screens. These programs bring the instructor and students together online at the same time of day to participate in live discussions, debates, brainstorming, role playing, software demonstrations, and panel discussions. A variety of synchronous tools, such as, Internet relay chat (IRC), which were used in this study, application sharing, whiteboards, and audio-video conferencing on the Web are used to engage learners.

One of the synchronous communication tools is Internet Relay Chat (IRC) which is used in this study. It is a multi-user, multi-channel chat system that is run on a network. It gives people all over the world the ability to talk (type) to one another in real time. Each user has a nickname (handle) and converses with other users either in private or on a channel (chat room). It is the one of the oldest, most popular and most-researched of the Internet computer-mediated communication. According to Simpson (1999), IRC also personalizes the Internet, which can sometimes seem cold and robotic. All in all, IRC environments provide an interactive, personal channel through which numerous varieties of communications can occur.

MUDs and MOOs

Multi-User Domain (MUD) and MUD Object-Oriented (MOO) environments are growing forms of synchronous communication that are more formal than simple chat rooms. With these environments, a theme is established with descriptive and manipulative capabilities. Here not only can we describe an object, we can "pick it up" as well. Within a session groups can participate in such activities as playing catch with a frisbee or swimming. The group interaction is not as informal as in a standard chat room because of the commands required to participate.

According to Simonson, Smaldino, and Albright (2000), a variation on chat is the MOO. MOO stands for MUD, object-oriented, with MUD an acronym for multi-user dimension or multi-user dungeon. Transferred to the Internet, MOOs are online, real-time, text-based virtual reality environments in which each participant plays a role.

Video conferencing

The technology of video conferencing has advanced rapidly in recent years. Picture and sound quality of large room-based systems are reasonable and the costs of installing and running them have dropped so that they are now becoming a realistic option for institutions teaching or planning to teach across more than one site. It allows groups of people in vastly different places to communicate together by hearing and seeing one another in rooms specially equipped with microphones, speakers, cameras, and projection equipment.

The most logical way to use a video-conference room is to connect two groups of people at different sites who wish to see and speak with each other. Alternatively, such a room can be used to connect a renowned expert in one location with a group of students in another. A third possibility is to allow students to view a phenomenon or a process that is unavailable on site (Laurillard 1993, cited in Christie, Jaun and Jonsson, 2002).

2.6 Distance Education Research Studies

Emerging technologies have forced a redefinition of distance education for a long time. At the same time, the distance education research agenda has also evolved. Researchers are examining learner attributes and perceptions as well as interaction patterns and how these contribute to the overall learning environment. While there is continued interest in the technology, recent research has shifted from a focus on technology itself to its effects on learners. Now, some of the recent research will be analyzed related to this study.

Firstly, as mentioned before, Dutton, Dutton, and Perry (2002) stated that online students were older. The subjects of their study were approximately 2000 students who enrolled popular online course at North Carolina State University. The students were more likely to have job and/or childcare responsibilities and longer average commutes to campus. They were less likely to be enrolled in traditional undergraduate programs and more likely to be lifelong learning students.

The internet is used as a source for print materials, resources and research sites, and as a primary information dissemination medium. Electronic mail and listservs are utilized to establish, develop, and maintain asynchronous conferences and conferencing discussion of course materials. Similar facilities were provided in the study conducted by Larison (1997), in which, students who were cognitively mature and relatively confident in their ability to express themselves have the least anxiety concerning the online course.

According to Ozkul (2000), with current student population of 636.000, Anadolu University Open Education system represented about 35% of the students of Turkish Higher Education system. Average age of the students was 24. Male students comprised 60% of the students and remaining 40% were female. About 70% of the students had full time and 8% part time employment. Handicapped students comprised about %1.5 of the student population.

In the literature, students' perspectives of web based instruction are varying but generally positive. According to Wegner, Holloway and Garton's study (1999), students thought that the online course was information-rich and adequate to the instructional task at hand made greater use of the learning environment. In their study, 80% of the survey items relating to instructional delivery and learning opportunities received higher ratings by students taking an online course than students taking the same class in a traditional classroom setting. However, lack of contact with the instructor was the chief concern mentioned by 50% of the online course students.

According to the study done by Daugherty and Funke (1998), from qualitative parts of the study, university faculties and students reported that web based education can be an effective tool for the teaching and learning process. Most students acknowledged the utility of the World Wide Web as a current and extensive source of information and one that was relatively easy to access. Faculties mentioned that web-based instruction had the potential to be highly interactive and can promote satisfying and effective communication patterns between instructors and students. Also, researchers stated that the students communicated with classmates for help in completing assignments, supported with technology frustrations, and to share acquired skills or content resources. They pointed out that students also felt that e-mail communications with the instructor gave them individual attention that was not often apparent in traditional coursework.

It was seen that majority of the students agreed that web-based teaching and learning had been useful in their units and they had felt positive and successful about their experience in using the web in the literature. However, they did not wish to see web-based teaching replace classroom teaching. According to the study conducted by Chin (1999), the strongest opposition came from a group of computing major students where 66% of responses disagreed that web-based teaching could substitute for classroom teaching.

Furthermore, while some studies reported high satisfaction from learners in online courses, others indicated that students often had experienced frustration with distance delivered courses (Ritchie and Newby, 1989 cited in Hill, 2000). The case study results stated that dissatisfaction with courses could have several consequences, among them: low evaluation ratings for the instructor, students dropping out of a course, students not taking distance delivered courses in the future, or low evaluations for the program that the course is part of.

The experts of this research area state that online education is not easy task for the learners. Larison (1997) confirmed that the asynchronous course usually required more conceptual writing and literacy skills than the traditional classroom course. The results of Larison's study showed that 95% of students surveyed felt that the asynchronous course required a higher amount of work than the traditional lecture course, and 83% of the students felt the asynchronous course required an equal or higher amount of writing.

In addition, the study on student satisfaction and perceived learning with online courses (Fredericksen, Pickett, Shea, Pelz, Swan, 2000) presented some useful data from over 1,400 students who took on-line courses. Some of the study highlights were as follows:

- Interaction with the teacher was the most significant contributor to perceived student learning in on-line courses.
- Students who reported that they participated in their on-line classes at higher levels than in the regular classroom reported the highest levels of perceived learning.
- Interaction with classmates was a significant contributor to perceived learning in on-line courses
- Student motivation for taking courses appeared to play an important role in perceived learning

According to LaMonica (2000) study in which 171 students and 105 instructors participated, instructors and students of Web-based courses agreed that the following elements were two important issues in online course. One of them was

that course content was easy to follow and the other one was that regular feedback to the student was provided. It can be concluded that course design and learner support in online environment were two important discussing topics to prepare more effective web-based education.

In the study conducted by Stavritis (2001), participants were asked to comment about courses given through internet what they like, what they didn't like and suggest improvements. From qualitative results, they were impressed by the organized course, the navigation options (a menu on top of page, a side bar, and embedded buttons inside the pages which guided them through the course), and seen updated information more easily. Also, almost all found the course interesting. The only negative comment that was made was that it was not easy to get online answers in real-time.

Continuous and constructive feedbacks in different forms seem to be an important condition for successful WBI learning. Rossman (1999) analyzed more than 3000 course evaluation documents from 154 WBI courses and found that learners needed guidelines from faculty regarding course requirements; that learners wanted prompt and specific feedback and wanted immediately transfer the information they learned in class to life or work situations; that learners preferred discussion forums with open and honest dialog; and that learners did not like to look after course relevant materials (books, articles, etc.) that were not offered by the WBI course

In brief, many researches suggested that student perceptions about online learning were influenced by a variety of audience characteristics. At the end of their study, Powers and Mitchell's (1997) identified mainly four themes related to students' perceptions of Web-based courses: student-student interaction, student-faculty or instructor interaction, peer support, and time demands.

Interaction in web-based education plays critical role to create effective environment. As mentioned before, there are four types of interaction. These are student-content interaction, student-teacher interaction, student-student

interaction, and student-interface interaction. Therefore, the relationship between interaction and student satisfaction is one of the hot topics in this research area recently. For example, Irani's study (1998) examined a random sample of 54 students in three communications classes currently using computer mediated communication. The CMC software package utilized at the university offering the courses included an icon driven interface, e-mail messaging functions such as personal and team mailboxes, real time chat, and the ability to attach files and URLs. The results showed that the increased communication potential of CMC could serve to improve students' attitudes and satisfaction with the course and their perceived outcome in the course. Hackman and Walker (1990) measured student perception of learning and satisfaction in a televised classroom. They found that interactions in the classroom greatly influenced student's perceived learning and course satisfaction. Regardless of the direct impact interaction has on actual achievement, these findings indicate that interaction is an important predictor of satisfaction with instruction.

Furthermore, computer mediated communication technologies bring new facilities in the web-based education. In the literature, there were many studies about comparing traditional course and online course with computer-mediated communication to see the effectiveness of this new environment. Kamin, Glicken, Hall, and Quarantillo (2001) investigated the use of asynchronous computer-mediated discussion groups as an adjunct teaching strategy in an evidence-based medicine course. The findings supported the use of online groups as an effective alternative to face-to-face methods, at least for some topics. CMC was implemented to solve an instructional problem related to conflicting schedules. At the end of the study, researchers suggested that instructors should use these kinds of platforms for continuous assessment of student thinking and problem-solving, which might not otherwise be possible for students at a remote site.

Although there are benefits of face-to-face communication in teaching and learning, CMC provides some additional educational advantages. According to the observations of Davie (1987 cited in Vincent 2000) in his/her study, it was

often noted that students did not have to compete for the floor and can say as much as they wanted without being interrupted, although they must still be responsive to the interest of others if they did not want to be ignored. Another advantage of a computer conference was that the medium provided a complete record of student interactions, of used not only to the lecturer in charge, but also to students themselves.

There are many synchronous and asynchronous communication tools to use in web-based education. Each tool has some advantage and disadvantage. Several studies about comparisons of synchronous and asynchronous communication tools in web based education were seen in the literature recently. One of these studies revealed that asynchronous or delayed conferencing fosters more depth of discussion than synchronous student chatting (Bonk, Hansen, 1998 cited in Hara, Bonk, and Angeli 2000).

One of the results in many studies was seen that the facilitator or instructor affects directly to the success of online course. The studies revealed that a moderator's role, mainly instructor, in CMC was significant for electronic interaction success and studies showed that student learning outcomes and satisfaction in online educational environments were related to changes in the traditional instructor's role from leader to that of facilitator and moderator (Faigley, 1990).

Finally, web-based teaching and learning was changing the culture of the university. Students who originally complained about having to use the Web for their courses were asking instructors why they did not use it. The study suggested that we should look into issues of how this new form of teaching fitted the expectations on faculty for teaching, research, and service (Sorg, Truman-Davis, Dziuban, Moskal, Hartman, and Juge, 1999).

CHAPTER 3

METHOD

In this section, main purpose of the study, research questions, design of the study, subjects of the study, instrumentation, online Information Technologies Certificate Programs (ITCPs), data collection procedure, data analysis, assumptions, and limitations are presented.

3.1 Main Purpose of the Study

The main purpose of the study is to investigate the perceptions of the 3rd, 4th and 5th programs' participants about online Information Technologies Certificate Programs (ITCPs).

3.2 Research Questions

The main research questions and the sub-questions that guide this study are presented below.

Question 1: What are the preferences of the 3rd, 4th and 5th programs' participants about online Information Technologies Certificate Programs (ITCPs)?

1.1 What are the factors that affect the 3rd, 4th and 5th programs' participants to choose online ITCPs?

1.2 What are the expectations of the 3rd, 4th and 5th programs' participants about online ITCPs?

1.3 What are the opinions of the 3rd, 4th and 5th programs' participants about the cost of online ITCPs?

Question 2: What are the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of courses in online Information Technologies Certificate Programs (ITCPs)?

2.1 What are the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of Computer Systems and Structures course in online ITCPs?

2.2 What are the perceptions of the 4th and 5th programs' participants about effectiveness of Introduction to Computer Programming with C course in online ITCPs?

2.3 What are the perceptions of the 4th and 5th programs' participants about effectiveness of Data Structures and Algorithms with C course in online ITCPs?

2.4 What are the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of Operating Systems with Unix course in online ITCPs?

2.5 What are the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of Software Engineering course in online ITCPs?

2.6 What are the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of Database Management Systems course in online ITCPs?

2.7 What are the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of Computer Networks course in online ITCPs?

2.8 What are the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of Software Development Project course in online ITCPs?

Question 3: What are the perceptions of the 3rd, 4th and 5th programs' participants about learner support in online Information Technologies Certificate Programs (ITCPs)?

3.1 What are the perceptions of the 3rd, 4th and 5th programs' participants about learner support of Computer Systems and Structures course in online ITCPs?

3.2 What are the perceptions of the 4th and 5th programs' participants about learner support of Introduction to Computer Programming with C course in online ITCPs?

3.3 What are the perceptions of the 4th and 5th programs' participants about learner support of Data Structures and Algorithms with C course in online ITCPs?

3.4 What are the perceptions of the 3rd, 4th and 5th programs' participants about learner support of Operating Systems with Unix course in online ITCPs?

3.5 What are the perceptions of the 3rd, 4th and 5th programs' participants about learner support of Software Engineering course in online ITCPs?

3.6 What are the perceptions of the 3rd, 4th and 5th programs' participants about learner support of Database Management Systems course in online ITCPs?

3.7 What are the perceptions of the 3rd, 4th and 5th programs' participants about learner support of Computer Networks course in online ITCPs?

3.8 What are the perceptions of the 3rd, 4th and 5th programs' participants about learner support of Software Development Project course in online ITCPs?

Question 4: What are the perceptions of the 3rd, 4th and 5th programs' participants about computer mediated communication in online Information Technologies Certificate Programs (ITCPs)?

4.1 What are the perceptions of the 3rd, 4th and 5th programs' participants about computer mediated communication of Computer Systems and Structures course in online ITCPs?

4.2 What are the perceptions of the 4th and 5th programs' participants about computer mediated communication of Introduction to Computer Programming with C course in online ITCPs?

4.3 What are the perceptions of the 4th and 5th programs' participants about computer mediated communication of Data Structures and Algorithms with C course in online ITCPs?

4.4 What are the perceptions of the 3rd, 4th and 5th programs' participants about computer mediated communication of Operating Systems with Unix course in online ITCPs?

4.5 What are the perceptions of the 3rd, 4th and 5th programs' participants about computer mediated communication of Software Engineering course in online ITCPs?

4.6 What are the perceptions of the 3rd, 4th and 5th programs' participants about computer mediated communication of Database Management Systems course in online ITCPs?

4.7 What are the perceptions of the 3rd, 4th and 5th programs' participants about computer mediated communication of Computer Networks course in online ITCPs?

4.8 What are the perceptions of the 3rd, 4th and 5th programs' participants about computer mediated communication of Software Development Project course in online ITCPs?

3.3 Design of the study

This study was a descriptive study that examined the perceptions of the 3rd, 4th and 5th programs' participants about online Information Technologies Certificate Programs (ITCPs) in regard to preferences, course effectiveness, learner support and computer mediated communication. Online ITCPs are based on synchronous and asynchronous education over the Internet offered by Computer Engineering Department of Middle East Technical University within four terms, which are completed in nine months. The 3rd program composed of nine courses and the 4th, 5th programs composed of eight courses. Two courses were given in the each term. In this study, the same eight courses given in 3rd, 4th and 5th programs were examined. For the purpose of the study, online survey was administrated to collect relevant data related to the courses given at the end of the each term in the 3rd, 4th and 5th programs. (see Appendix B)

3.4 Subjects of the Study

The subjects of this study were the 3rd, 4th and 5th programs' participants of online ITCPs who completed the online survey. Convenient sampling method was used in this study. 291 participants registered to the 3rd, 4th and 5th online ITCPs. 97 of participants were from the 3rd program, 106 of participants were from the 4th program, and 88 of participants were from the 5th program. However, the data to be analyzed for this study were obtained from participants who responded the online survey at the end of the each term of the programs. In addition, the number of participants decreased in the following terms in each program because some of the participants didn't complete the programs. The number of participants who responded to the online survey are given in Table 3.1

Table 3.1: The number of participants who responded to the online surveys

	1.semester	2.semester	3.semester	4.semester	Total
3rd prog	38	25	58	37	158
4th prog	87	69	49	47	252
5th prog	61	43	51	38	193

Table 3.2 presents the demographic characteristics of the participants who registered to the 3rd, 4th and 5th online ITCPs. The number of male participants was greater than the number of female participants, and the participants' age ranged from 20 to 29. The majority of the participants' age range in the 4th and 5th programs was 25-29, and in the 3rd program was 20-24. In addition, majority of the participants attended the online ITCPs from Ankara and Istanbul.

Table 3.2: The demographic characteristics of the participants

	3rd program		4th program		5th program	
	N	%	N	%	N	%
Sex						
Female	19	21,8	34	32,1	25	28,4
Male	68	78,2	72	67,9	63	71,6
Age						
19 and below	2	2,3	1	0,9	0	0,0
20-24	38	43,7	35	33,0	24	27,2
25-29	27	31,0	40	37,7	43	48,8
30-34	11	12,6	21	19,8	13	14,8
35-39	7	8,0	6	5,7	4	4,5
40 and above	2	2,3	3	2,8	4	4,5
Cities the participants from						
Ankara	41	42,3	65	62,5	56	63,6
İstanbul	32	33,0	21	20,2	17	19,3
İzmir	6	6,2	5	4,8	2	2,3
Others	18	18,6	15	14,4	13	14,8

In the programs, there were participants who were university graduates, undergraduate students, graduate students, military school students and high school graduates presented in Table 3.3. Participants who graduated from high school were accepted to register only in the 3rd program and participants who graduated from military school applied to register only for the 4th program. Majority of the participants were university graduates and undergraduate students.

Table 3.3: Education levels of participants

Education Levels	3rd program		4th program		5th program	
	N	%	N	%	N	%
University graduates	45	46,4	63	59,4	45	51,1
Undergraduate students	35	36,1	34	32,1	22	25,0
Graduate students	8	8,2	6	5,7	21	23,9
Military school students	0	0,0	3	2,8	0	0,0
High school graduates	9	9,3	0	0,0	0	0,0

As shown in Table 3.4, majority of the participants were graduated or currently studying at Faculties of Engineering, Economics and Administrative Sciences, and Sciences.

Table 3.4: The faculties which the participants graduated from or currently student at

Faculties	3rd program		4th program		5th program	
	N	%	N	%	N	%
Faculties of Engineering	32	33,0	42	39,6	43	48,9
Faculties of Economic and Administrative Sciences	17	17,5	27	25,5	16	18,2
Faculties of Science	13	13,4	16	15,1	14	15,9
Technical Vocational School of Higher Education	8	8,2	4	3,8	0	0,0
Faculties of Literature	7	7,2	2	1,9	3	3i4
Faculties of Education	4	4,1	3	2,8	6	6,8
Other Faculties	16	16,5	12	11,3	6	6,8

3.5 Instrumentation

An online survey that included structured, semi structured and unstructured (open-ended) questions was used to collect the data to investigate the participants' preferences and perceptions about the 3rd, 4th and 5th online ITCPs. Demographic characteristics of the participants were obtained from the application forms they filled out while registrations.

3.5.1 Online Survey

The online survey which used to collect data for this study was prepared collaboratively by a team consisting of the instructors in the online ITCPs, and the specialists from Continuing Education Center. With online survey, it was thought that all participants could access it more easily. It also minimized response error, and results were coded with minimum effort. The reliability coefficient of the survey was found to be 0.71.

The parts of online survey used to gather the data in this study are as follows;

Part I: This part was used to search out preferences of the 3rd, 4th and 5th programs' participants about online ITCPs. It consisted of three questions. Two of them were multiple response type questions which had four to six options and one other category. More than one alternative can be selected to answer the questions or the questions be answered by writing in the textbox without selecting an alternative. The last question was a multiple choice type which had 3 alternatives (see Appendix B).

Part II: The second part was used to search out perceptions of the 3rd, 4th and 5th programs' participants about

- courses effectiveness given in online ITCPs
- learner support in online ITCPs
- computer mediated communication in online ITCPs

In this part, there were three sub-scales. The first one was used to examine the perceptions of the 3rd, 4th and 5th programs' participants about courses given in online ITCPs. It had 13 questions that were rated on a likert-type with 1 equaling agreement, 2 equaling slightly agreement and 3 equaling disagreement.

The second one was used to examine the perceptions of the 3rd, 4th and 5th programs' participants about learner support in online ITCPs and it had two questions that again were rated on a likert-type with 1 equaling agreement, 2 equaling slightly agreement and 3 equaling disagreement.

The third one was used to examine the perceptions of the 3rd, 4th and 5th programs' participants about computer mediated communication in online ITCPs and it had seven questions. Five of them were likert-type questions as the like other parts and again two of them were multiple response type which had four to six options, and one other category. For these two questions, more than one alternative can be selected to answer

the questions or the questions could be answered by writing opinions in the textbox without selecting an alternative. The last question was open-ended (see Appendix B).

3.5.2 Online Information Technologies Certificate Program (ITCP)

The online Information Technologies Certificate Program (ITCP) is one of the first Internet Based Education Project of Middle East Technical University, which started in May 1998. It is based on synchronous and asynchronous education over the Internet offered by Computer Engineering Department with Turkish course materials prepared by the instructors who give the courses from the same department. The main aim of the online ITCP is to train the participants in IT field to meet demand in the field of computer technologies in Turkey. Furthermore, the online ITCP provides opportunities for the people who can not get education in information technologies or computer engineering, but who are interested in this area, who would like improve themselves in this area and desire to make progress in their existing career.

Internet Based Education Project is the project of a series of Internet-based programs. One of these programs is the online Information Technologies Certificate Program, which is still active now. At the beginning, it has started with the organization of IBM which sponsored the program, METU Continuing Education Center, and Department of Computer Engineering. However, with the following years, it has been conducted in the management responsibility of Continuing Education Center, academic responsibility of the Department of Computer Engineering, and technical support of METU Computer Center.

This program enables participants to take the lectures whenever they want, wherever they want; with the chance of arranging their study time, reviewing as much as they like and discussing the necessary points.

473 participants registered to the online ITCPs from the first program to the fifth program. 152 of them completed all courses successfully and they have received

the certificate of the online Information Technologies Programs. Any participants who graduated at least from high school could apply to this program, but after third program, participants who are students or who graduated from 2 or 4 year university programs have been accepted to the programs. Other expected characteristics of participants to be enrolled in the program are as follows;

- being computer literate
- accessing a computer which has Internet connection and multimedia properties
- intermediate level of English (being able to understand what he/she reads)
- attending face to face courses and examinations, which will be held at METU campus for two days in each eight-week semester
- sparing at least 6 hours for each course in a week

The total fee for online Information Technologies Certificate Program is $2000 in the first, second, third, and fourth programs and 1.5 billion TL in the fifth program and this fee includes registration, all course materials, 3 exams for each course, assignments, and a certificate after successful completion of the program. Textbooks, workbooks, ratio of value added tax and other related expenses are not included in this fee. In addition, there are 30 % discounts for the university student participants and 10 % discounts for the participants who pay whole fee in cash.

In addition, there have been changes in online ITCPs since the first program. This program started with fifteen months for the first group, decreased to twelve months for the second group and nine months for the third, fourth and fifth groups. It is composed of eight courses and a Software Development Project given in the first and second groups. At the beginning, the names of the courses and the terms they were given are as follows: Computers Systems and Structures, Computer Programming with Java I, Computer Programming with Java II, Operating Systems with UNIX, Data Structures and Algorithms with C++,

Software Engineering, Database Management Systems, Computer Networks, and Software Development Project. After the third program, number of courses given in online ITCPs decreased to eight courses and some of the courses were replaced by different courses. For example, Computer Programming with Java I course was replaced by Introduction to Computer Programming with C course and Data Structures and Algorithms with C++ course was replaced by Data Structures and Algorithms with C course in the fourth and fifth programs. Furthermore, Computer Programming with Java I and II courses were combined and given as an elective course in the fourth and fifth programs.

This program does not only aim to supply lecture notes on the Internet like their primitive examples but also provides participants a pleasant way of learning with activities other than reading from computer with related visual and auditory elements and interactive communication channels. In addition to the interactive course material, each course has an e-mail address, discussion list and chat sessions to provide interaction between instructors and participants, and participants and participants. At the beginning of the programs, a CD that includes necessary programs, compliers, editors for the courses are posted to the participants.

Furthermore, each course, except Software Development Project course, has one text book that provides more detailed information. Reading assignments are given from these text books. Also, for each lesson, at least three homeworks were assigned to the participants during the terms. At the end of each term, there are face-to-face lectures for each course and traditional final examinations of the courses within the campus of Middle East Technical University. The participants' final grades were based on mainly final examinations, homeworks, attendance to the chat sessions and participation in the discussion lists. In addition, in the last term, the groups of the participants or individuals in the Software Development Project course prepare software projects which are

mainly used in real life with guidance of the instructors. They are presented to all participants at the end of the programs.

In conclusion, this official certificate is approved by the president of the METU, the chairman of the Computer Engineering Department and the president of the Continuing Education Center.

3.6 Data Collection Procedures

In these online ITCPs, online survey was prepared to gather the participants' perceptions about the all certificate programs. Therefore, it was prepared in a more detailed way. However, the purpose of this study was to investigate the 3rd, 4th and 5th programs participants' preferences about online ITCPs, and perceptions of course effectiveness, learner support and CMC in online ITCPs. Therefore, two parts of whole the survey were analyzed in this study.

At the beginning of this online program, applications to the program and participants information were managed by IBM which sponsored the programs in the first and second groups in 1998. However, all services were managed by METU Continuing Education Center and Department of Computer Engineering after the second program. At the end of the second program, online survey was prepared and this study was started with beginning of the third program in 1999.

After the programs started, the online survey also started to apply to the participants through the Internet. This part of the survey, related to this study, was about the preferences of the participants about the online ITCPs (see Appendix B).

In addition to online survey, participants had to fill out the application form before they started the program and signed the contract of the program for the acceptance of the rules and requirements in each program. These forms can be accessed via web page too. The application form had all demographics

information of the participants such as, name, age, occupation, education level, etc. It is provided in Appendix A. The participants can mail them or turn them in by coming to the registration office in METU.

As mentioned before, online ITCPs had four terms. Each term lasted two months and two courses were given in each term. After face to face sessions and exams of the courses at the end of each term, the participants were required to fill out the online survey through Internet which was related to about course effectiveness, learner support, and CMC (see Appendix B). Volunteer participants filled and submitted the survey. All data about 3rd, 4th and 5th participants in the online survey were gathered in the database, and then they were used in this study.

3.7 Data Analysis

This study was descriptive study and the online survey was used to gather data. The data were in nominal and open-ended types. The nominal data was analyzed by using mean, frequency and percentiles distribution and also in terms of "agreement", "slightly agreement" and "disagreement".

In the data analysis, firstly, the related data were selected from raw data obtained by online survey. Afterwards, they were simplified and categorized so that the conclusions could be reasonably drawn and verified. Then, the data were displayed into tables. In addition, open-ended questions were analyzed in a qualitative manner to express the perceptions of participants in detailed way. As Miles and Huberman (1994) suggested that the qualitative data analysis consisted of three simultaneous activities: data reduction, data display, and conclusion draws. Data reduction used to simplify and focus different categories of the raw data. Data display included organization of the data within the categories. Finally, conclusions were drawn from specific to a more generalized one.

3.8 Assumptions of the Study

For this study, the following assumptions were made:

- All participants answered the questions to all measures used in this study, accurately and sincerely.
- The data were accurately recorded and analyzed.
- Reliability and validity of the all measures used in this study are accurate enough to permit accurate assumptions.

3.9 Limitation of the Study

For this study, the following limitations were made:

- This study limited to third, fourth and fifth programs of online Information Technologies Certificate Programs (ITCPs).
- The sample size in this study was limited by number of participants registered to third, fourth and fifth online ITCPs.
- The study was limited to the online survey developed by the ITCP's team members
- Validity is limited to the honesty of the participants' responses and the reliability of the instruments used in this study.
- The online survey were submitted only by volunteered participants

CHAPTER 4

RESULTS

In this chapter, the results of the study in regard to research questions are presented. At the end of the chapter, the findings of the study summarized.

4.1 The preferences of the participants about online ITCPs (Research Question 1)

The preferences of the 3rd, 4th and 5th programs' participants about online Information Technologies Certificate Programs are the first main research question. There were 3 sub-questions related with the first main research question. Two of them had alternative responses from which participants can select more than one, and the last one had also three alternative responses from which participants can select only one.

4.1.1 The factors that affect the participants in choosing online ITCPs (Research Question 1.1)

The factors that affect the 3rd, 4th and 5th programs' participants in choosing online ITCPs were the first sub-question of the research question 1.

As seen in table 4.1, "Education is offered by Middle East Technical University" was one of the most influential factors in choosing online ITCPs for 25.9 % of the 3rd, 22.9 % of the 4th and 23.1 % of the 5th program's participants.

18.8 % of the 3rd, 21.4 % of the 4th, and 22.7 % of the 5th program's participants thought that this program would be effective in their career as one of the factors in choosing online ITCPs. Also, 24.1 % of the 3rd, 20.4 % of the 4th, and 19.4 % of the 5th program's participants stated that education being over the Internet was one of the factors for their choosing online ITCPs.

Furthermore, 23.3 % of the 3rd, 19.6 % of the 4th, and 20.4 % of the 5th program's participants thought that they had special interest about the topic of this certificate program as one of the other factors in choosing online ITCPs.

One factor, which is online ITCPs being a certificate program, affected 8.0 % of the 3rd, 13.9 % of the 4th, and 13.9 % of the 5th program's participants in choosing it. The last factor, which is the request of their companies to join this program, affected only 0.9 % of the 3rd, 1.8 % of the 4th, and 0.5 % of the 5th program's participants in choosing online ITCPs.

In addition, there were other factors stated. Two of the 3rd and three of the 5th program's participants stated that Information Technology would be more popular in near future and they may change their work area and make a carrier in Information Technologies. One of the 3rd program's participants stated that "I couldn't go to the university" and one of the 4th program's participants stated that "I want to have the view of a computer engineer".

Table 4.1: The factors that affect the participants in choosing online ITCPs

	3rd program		4th program		5th program	
	N	**%**	**N**	**%**	**N**	**%**
Education is offered by Middle East Technical University	29	25.9	64	22.9	50	23.1
I think this program will be effective in my career	21	18.8	60	21.4	49	22.7
Education is over the Internet	27	24.1	57	20.4	42	19.4
I have special interest about topic of this program	25	22.3	55	19.6	44	20.4
It is a certificate program	9	8.0	39	13.9	30	13.9
My company wants me to join this program	1	0.9	5	1.8	1	0.5

N: Number of participants, %: Percentage of participants

4.1.2. The expectations of the participants about online ITCPs (Research Question 1.2)

The expectations of the 3rd, 4th and 5th programs' participants about online ITCPs were the second sub-question of the research question 1.

As seen in table 4.2, "To be more productive in my present job" was one of the most influential expectations about online ITCPs for 41.1 % of the 3rd, 31.3 % of the 4th, and 28.7 % of the 5th program's participants. 26.8 % of the 3rd, 26.0 % of the 4th, and 24.5 % of the 5th program's participants expected that they made progress in their existing career with the help of online ITCPs.

Also, one of the expectations of approximately 23 % of the participants in the 3rd, 4th and 5th programs' was about finding a job with the help of online ITCPs. Another expectation was stated by the 8.9 % of the 3rd, 19.1 % of the 4th, and 23.4 % of the 5th program's participants was about changing their work area.

In addition, there were other expectations stated, three of the 3rd and one of the 4th program's participants expected that they would find a second job or have alternative occupations. Two of the 3rd, three of the 4th and two of the 5th program's participants expected that they wanted to have an idea and experience about information technology and some of them expected to develop themselves. Moreover, one of the 3rd and one of the 5th program's participants expected that "I want to be dominant in computer science".

Furthermore, one of the 3rd, three of the 4th and three of the 5th program's participants anticipated that it provided a background in their academic career or it would be reference for graduate school application. One of the 3rd and one of the 4th program's participants expected that "I will be directed by the instructors of computer engineering of METU". One of the 3rd and one of the 5th program's participants expected that "I want to go abroad".

Table 4.2: The participants' expectations about online ITCPs

	3rd program		4th program		5th program	
	N	**%**	**N**	**%**	**N**	**%**
To be more productive in my present job	23	41.1	41	31.3	27	28.7
To make progress in my existing career	15	26.8	34	26.0	23	24.5
To find a job	13	23.2	31	23.7	22	23.4
To change work area	5	8.9	25	19.1	22	23.4

N: Number of participants, %: Percentage of participants

4.1.3. The opinions of participants about the cost of online ITCPs (Research Question 1.3)

The opinions of the 3rd, 4th and 5th programs' participants about the cost of online ITCPs were the third sub-question of the research question 1. As seen in Table 4.3, 61.5 % of the 3rd, 59.3 % of the 4th, and 43.1 % of the 5th program's participants thought that the cost of certificate program was high. The results revealed that most of the 3rd and 4th programs' participants agreed that the cost of certificate program was high, but 56.9 % of the 5th program's participants thought the cost of certificate program was normal.

Table 4.3: The participants' opinions about the cost of online ITCPs

	3rd program		4th program		5th program	
	N	**%**	**N**	**%**	**N**	**%**
High	24	61.5	51	59.3	25	43.1
Normal	15	38.5	34	39.5	33	56.9
Low	0	0.0	1	1.2	0	0.0

N: Number of participants, %: Percentage of participants

4.2 The perceptions of participants about effectiveness of courses in online ITCPs (Research Question 2)

The perceptions of the 3rd, 4th and 5th programs' participants about the effectiveness of the courses in online ITCPs are the second main research question. To collect relevant data, 13 questions were asked for each sub-question.

The results of the research questions 2 were discussed based on Table 4.4.

Table 4.4: The intervals of the mean scores (out of 3)

	Disagree	Slightly Agree	Agree
Mean scores	from 1 to 1.66	from 1.67 to 2.32	from 2.33 to 3

4.2.1 The perceptions of participants about the effectiveness of the Computer Systems and Structures course in online ITCPs (Research Question 2.1)

The perceptions of the 3rd, 4th and 5th programs' participants about the effectiveness of Computer Systems and Structures course in online ITCPs were the first sub-question of research question 2. The results of the questions and answers with percentages are given in Table 4.5.

As seen in Table 4.5, the overall mean of the mean scores were 2.6 that was in agreement interval in the 3rd and 4th programs and 2.5 that was also in agreement interval in the 5th program. The mean scores ranged from 2.3 to 2.8 in the 3rd program, from 2.0 to 2.9 in the 4th program, and from 2.1 to 2.8 in the 5th program (out of 3).

According to the data, the highest mean scores in the 3rd program were related to item 1, which was about the fluent and clear course notes (M=Means of item=2.8), item 7, which was about the helpfulness of the examples to understand the subject (M=2.8), and item 12, which was about learning the subject (M=2.8). The lowest mean scores in the 3rd program were related to item 3, which was about the difficulty of course subject (M=2.3), and item 4, which was about often finding mistakes in the course notes (M=2.3).

In the 4th program, the highest mean scores were related to item 1, which was about the fluent and clear course notes as indicated in the 3rd program (M=2.9), and item 13, which was about the increasing participants' interest to the subject

of course (M=2.9). The lowest mean scores in the 4th program were related to item 3 (M=2.0), and item 4 (M=2.3) as indicated in the 3rd program.

In the 5th program, the highest mean scores were related to item 5, which was about the usefulness of the textbook and resources (M=2.8), and item 13, which was about the increasing participants' interest to the subject of course (M=2.8). The lowest mean scores in the 5th program were related to item 6, which was about the sufficiency of the examples (M=2.1), item 2, which was about satisfaction from course notes (M=2.3), and item 3 (M=2.3).

Moreover, the percentage of participants who agreed on some items increased from the 3rd program to the 4th program, but decreased from the 4th program to the 5th program. These items were items 1, 3, 4, 5, 9, 10, 11, and item 13. For example, the percentage of the participants who agreed to item 5, which was the usefulness of the textbook and resources, was 63.9 % in the 3rd program, 87.2 % in the 4th program, 81.2 % in the 5th program and the percentage of participants who agreed to item 11, which was about the measurement of the participants' knowledge level with exam questions, was 77.8 % in the 3rd program, 82.6 % in the 4th program, and 53.3 % in the 5th program.

Furthermore, the percentage of participants who agreed on items 2, 6, 7, 8 and 12 were nearly the same in the 3rd and 4th program, but decreased in the 5th program. For example, the percentage of participants who agreed on item 12, which was about learning the subject, was 86.1 % in the 3rd program, 86.0 % in the 4th program, but 76.7 % in the 5th program.

In conclusion, the perceptions of the 3rd, 4th and 5th programs' participants about effectiveness of Computer Systems and Structures course were positive and this increased a little from the 3rd program to the 4th program, but it decreased a little again in the 5th program.

Table 4.5: The participants' perception of the Computer Systems and Structures Course effectiveness

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
1) The course notes were fluent and clear	83,3	8,3	8,3	36	2.8	87,2	11,6	1,2	86	2.9	65,0	31,7	3,3	60	2.6
2) The course notes were satisfying	66,7	19,4	13,9	36	2.5	64,0	25,6	10,5	86	2.5	46,7	35,0	18,3	60	2.3
3) The course subject was difficult	25,0	22,2	52,8	36	2.3	41,9	18,6	39,5	86	2.0	30,0	6,7	63,3	60	2.3
4) I often found mistakes in the course notes	22,2	22,2	50,0	36	2.3	38,4	8,1	53,5	86	2.2	20,0	21,7	58,3	60	2.4
5) The textbook and resources were useful	63,9	19,4	16,7	36	2.5	87,2	7,0	5,8	86	2.8	81,7	11,7	6,7	60	2.8
6) The examples were sufficient	66,7	25,0	8,3	36	2.6	66,3	22,1	11,6	86	2.5	38,3	33,3	28,3	60	2.1
7) The examples were helpful in understanding the subject	83,3	13,9	2,8	36	2.8	82,6	14,0	3,5	86	2.8	66,7	28,3	5,0	60	2.6
8) The multimedia applications were sufficient	58,3	22,2	19,4	36	2.4	62,8	18,6	18,6	86	2.4	61,7	23,3	18,3	60	2.4
9) The exercises were helpful in understanding the subject	63,9	25,0	11,1	36	2.5	83,7	11,6	4,7	86	2.8	68,3	26,7	5,0	60	2.6
10) The homeworks were helpful in learning the subject	69,4	19,4	11,1	36	2.6	80,2	8,1	11,6	86	2.7	76,7	13,3	10,0	60	2.7
11) The exam questions sufficiently measured our knowledge level	77,8	5,6	16,7	36	2.6	82,6	9,3	8,1	86	2.7	53,3	28,3	18,3	60	2.4
12) I learned the subjects explained in the course	86,1	11,1	2,8	36	2.8	86,0	11,6	2,3	86	2.8	76,7	20,0	3,3	60	2.7
13) The course increased my interest to the subject	80,6	8,3	11,1	36	2.7	93,0	5,8	1,2	86	2.9	86,7	10,0	3,3	60	2.8
Average of the means:					2.6					2.6					2.5

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.2.2 The perceptions of participants about the effectiveness of the Introduction to Computer Programming with C course in online ITCPs (Research Question 2.2)

Introduction to Computer Programming with C course was given in the 4th and 5th programs instead of Introduction to Computer Programming with Java-I course given in the 3rd program in online ITCPs. The perceptions of the 4th and 5th programs' participants about the effectiveness of Introduction to Computer Programming with C course in online ITCPs were the second sub-question of research question 2. The questions and answers with percentages are given in Table 4.6.

As seen in Table 4.6, the overall mean of the mean scores were 2.5 that was in the agreement interval in the 4th and 5th programs. The mean scores ranged from 1.7 to 2.9 in the 4th program and from 2.1 to 2.9 in the 5th program (out of 3).

The highest mean scores in the 4th program were related to item 1, which was about the fluency and clearance of the course notes (M=2.9), and item 13, which was about the increasing participants' interest to the subject of course (M=2.9). The lowest mean scores in the 4th program were related to item 3, which was about the difficulty of the course subject (M=1.7), and item 4, which was about often finding often mistakes in the course notes (M=2.0).

The highest mean scores in the 5th program were related to item 10, which was about the helpfulness of the homeworks in learning the subject (M=2.9), and item 13, which was about the increasing participants' interest to the subject of course (M=2.9). The lowest mean scores in the 5th program were related to item 3 (M=2.1) and item 6, which was about the sufficiency of the examples (M=2.1).

Moreover, the percentage of participants who agreed on some items decreased from the 4th program to 5th program. These items were items 1, 2, 3, 4, 6, 7, 8, 9, and item 11. For example, the percentages of participants who agreed to item 3 were 57 % in the 4th program and 36.7 % in the 5th program, and the percentage

of participants who agreed to item 4 was 40.7 % in the 4th program and 25 % in the 5th program.

Furthermore, the percentage of participants who agreed on items 5, 10, 12, and 13 were nearly the same in the 4th and 5th program or increased very little. For example, the percentages of participants who agreed with item 12, which was about learning the subject, were 79.1 % in the 4th program and 81.7 % in the 5th program.

In conclusion, the perceptions of the 4th and 5th programs' participants about the effectiveness of Introduction to Computer Programming with C course were positive and nearly the same in two programs.

Table 4.6: The participants' perception of the Introduction to Computer Programming with C Course effectiveness

	4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
1) The course notes were fluent and clear	88,4	10,5	1,2	86	2.9	76,7	21,7	1,7	60	2.8
2) The course notes were satisfying	58,1	23,3	18,6	86	2.4	45,0	33,3	21,7	60	2.2
3) The course subject was difficult	57,0	19,8	23,3	86	1.7	36,7	15,0	48,3	60	2.1
4) I often found mistakes in the course notes	40,7	14,0	45,3	86	2.0	25,0	15,0	60,0	60	2.4
5) The textbook and resources were useful	82,6	7,0	10,5	86	2.7	83,3	10,0	6,7	60	2.8
6) The examples were sufficient	54,7	23,3	22,1	86	2.3	36,7	33,3	30,0	60	2.1
7) The examples were helpful in understanding the subject	76,7	16,3	7,0	86	2.7	61,7	31,7	6,7	60	2.6
8) The multimedia applications were sufficient	64,0	12,8	23,3	86	2.4	60,0	23,3	16,7	60	2.4
9) The exercises were helpful in understanding the subject	80,2	14,0	5,8	86	2.7	75,0	20,0	5,0	60	2.7
10) The homeworks were helpful in learning the subject	89,5	4,7	5,8	86	2.8	90,0	6,7	3,3	60	2.9
11) The exam questions sufficiently measured our knowledge level	79,1	10,5	10,5	86	2.7	60,0	25,0	15,0	60	2.5
12) I learned the subjects explained in the course	79,1	15,1	7,0	86	2.7	81,7	13,3	5,0	60	2.8
13) The course increased my interest to the subject	91,9	4,7	3,5	86	2.9	91,7	6,7	1,7	60	2.9
Average of the means:					2.5					2.5

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

Perceptions about first semester's courses from open-ended part of questionnaire:
The followings are the analysis of written perceptions of the 3rd, 4th and 5th programs' participants about courses which are Computer Systems and Structures course and Introduction to Computer Programming with C course given in the first semester of online ITCPs.

Analysis of the data revealed that the general perceptions of the 3rd, 4th and 5th programs' participants about courses given in the first semester were positive. Moreover, three of the 3rd and one of the 5th program's participants stated that the content was well prepared, the proper courses were selected. Two of the 3rd, eight of the 4th and four of the 5th program's participants stated that the way of giving courses were satisfying. Two of the 4th program's participants wrote that "I got the basic information and I can improve myself now". Two of the 3rd program's participants stated that this certificate program reached its aim.

Although the general perceptions of participants about courses were positive, they had some suggestions and criticisms about courses. Three of the 3rd, eighteen of the 4th and eight of the 5th program's participants stated that the contents of course notes should comprise more examples, exercises and detailed information. Also, one of the 3rd, two of the 4th and one of the 5th program's participants stated that it should consist of more applications and practical examples since some course topics consisted of much theoretical knowledge. Two of the 3rd, two of the 4th and eight of the 5th program's participants stated that "Course notes consist of basic information; it should consist of difficult, more extended and detailed topics".

In addition, one of the 3rd and eight of the 5th program's participants expressed that "The course should be more visual and it should have more animations and applets". One of the 4th and one of the 5th program's participants thought that the topics of courses were too compact, the semesters in the program were too short and the flow of courses was very fast. One of the 4th program's participants

mentioned that the topics of course notes were disorganized because the topic of course notes were not distributed equally in each week.

One of the lowest mean score in first semester was related to item 4, which was about often finding mistakes in the course notes. Moreover, two of the 3rd, three of the 4th, and two of the 5th program's participants confirmed that the language used in the course notes was incomprehensible; there were some spelling and grammar errors in the notes. Also three of them added that "I have some difficulties in understanding some concepts in the course notes because I sometimes need the mean of concept in English".

Furthermore, three of the 3rd, two of the 4th and one of the 5th program's participants stated that more resources should be given in the courses, such as, references, links and books. One participant from the 4th program expressed that the programs in the course notes should be run correctly. One participant from the 5th program expressed that the complier given for programming should be explained in a detailed way.

Regarding to the 3rd, 4th and 5th participant's requests about homeworks in the first semester courses, one of the 3rd and six of the 4th program's participants expressed that "The homeworks' results should be more detailed and the more feedback should be given". Also, six of the 5th program's participants suggested that the homeworks' answers and results should be declared in a short time. One of the 4th and one of the 5th program's participants mentioned that more time should be given to them for doing homeworks. Also, one of the 3rd and one of the 4th program's participants suggested that the homeworks should be given in each week.

In addition, one of the 3rd, three of the 4th and one of the 5th program's participants stated that the homeworks should be not in the assessment criteria or affect in a minor way and doing homeworks should be not compulsory. One of the 4th and one of the 5th program's participants suggested that the homeworks should be more difficult. Another one expressed that "The course notes are not

enough to do homeworks". One of the 3rd and one of the 5th program's participants stated that the homeworks should be more original and the applications should be given as homeworks.

The perceptions of the participants indicated that the exam questions sufficiently measured their knowledge level. However, two of the 4th and one of the 5th program's participants mentioned that the participants should be informed about exam before it. For example, examples or exercises may be given. One of the 4th program's participants suggested that the exams questions and answers should be exposed to the participants after exam. Furthermore, two of the 4th and one of the 5th program's participants stated that "there are some questions about topics which are not in the course notes". One of the 3rd program's participants stated that the wrong answers shouldn't be in evaluation criteria.

4.2.3 The perceptions of participants about the effectiveness of the Data Structure and Algorithms course in online ITCPs (Research Question 2.3)

Data Structure and Algorithms course was given in the 4th and 5th program instead of Introduction to Computer Programming with Java-II course given in 3rd program in online ITCPs. The perceptions of the 4th and 5th programs' participants about the effectiveness of Data Structure and Algorithms course in online ITCPs were the third sub-question of research question 2. The questions and answers with percentages are given in Table 4.7

As it is observed in Table 4.7, the overall mean of the mean scores were 2.5 in the range of agreement interval in the 4th and 2.3 in the range of slightly agreement interval in the 5th programs. In the light of the findings, the mean scores ranged from 1.6 to 2.9 in the 4th program and from 1.9 to 2.5 in the 5th program (out of 3).

The highest mean score in the 4th program was related to item 13, which was about the increasing participants' interest to the subject of course (M=2.9). Another items which had high mean scores were item 5, which was about the

usefulness of the textbook and resources (M=2.8), item 9, which was about the helpfulness of the examples to understand the subject (M=2.8), and item 11, which was about the measurement of the participants' knowledge level with exam questions (M=2.8). The lowest mean scores in the 4th program were related to again item 3, which was about the difficulty of the course subject (M=1.6), and item 4, which was about often finding mistakes in the course notes (M=1.8).

The highest mean scores, which are the 2.5 in the 5th program, were related to item 4, 8, 9, 10, 11, and 13. The lowest mean scores in the 5th program were related to item 6, which was about the sufficiency of the examples (M=1.9), item 2, which was about the satisfaction from the course notes and item 3 (M=2.1) as indicated in the 4th program.

Furthermore, the percentages of participants who disagreed on item 3, increased from 26.2 % in the 4th program to 35.3 % in the 5th program and item 4, which was about often finding mistakes in the course notes, from 32.3 % in the 4th program to 60.6 % in the 5th program. However, the percentages of participants who agreed or slightly agreed on all other items decreased from the 4th program to the 5th program. For example, the percentages of participants who agreed on item 6 were 60.0 % in the 4th program and 27.3 % in the 5th program and item 7, which was about the helpfulness of the examples to understand the subject, were 76.9 % in the 4th program and 36.4 % in the 5th program.

In conclusion, the perceptions of participants about effectiveness of Data Structure and Algorithms course were positive in the 4th program, but this changed a little negatively from the 4th program to the 5th program.

Table 4.7: The participants' perception of the Data Structure and Algorithms course effectiveness

	4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
1) The course notes were fluent and clear	72,3	10,8	16,9	65	2.6	48,6	31,4	20,0	35	2.3
2) The course notes were satisfying	52,3	30,8	16,9	65	2.4	35,3	38,2	26,5	34	2.1
3) The course subject was difficult	63,1	10,8	26,2	65	1.6	23,5	41,2	35,3	34	2.1
4) I often found mistakes in the course notes	49,2	18,5	32,3	65	1.8	6,1	33,3	60,6	33	2.5
5) The textbook and resources were useful	83,1	13,8	3,1	65	2.8	50,0	37,5	12,5	32	2.4
6) The examples were sufficient	60,0	18,5	21,5	65	2.4	27,3	39,4	33,3	33	1.9
7) The examples were helpful in understanding the subject	76,9	13,8	9,2	65	2.7	36,4	48,5	15,2	33	2.2
8) The multimedia applications were sufficient	78,5	15,4	6,2	65	2.7	57,6	30,3	12,1	33	2.5
9) The exercises were helpful in understanding the subject	86,2	10,8	3,1	65	2.8	54,5	36,4	9,1	33	2.5
10) The homeworks were helpful in learning the subject	81,5	10,8	7,7	65	2.7	51,5	45,5	3,0	33	2.5
11) The exam questions sufficiently measured our knowledge level	81,5	13,8	4,6	65	2.8	60,0	26,7	13,3	30	2.5
12) I learned the subjects explained in the course	78,5	15,4	6,2	65	2.7	45,5	42,4	12,1	33	2.3
13) The course increased my interest to the subject	90,8	7,7	1,5	65	2.9	65,6	21,9	12,5	32	2.5
Average of the means:					2.5					2.3

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.2.4 The perceptions of participants about the effectiveness of the Operating Systems with Unix course in online ITCPs (Research Question2.4)

The perceptions of the 3rd, 4th and 5th programs' participants about the effectiveness of the Operating Systems with Unix course in online ITCPs were the fourth sub-question of research question 2. The questions and answers with percentages are given in Table 4.8

As shown in Table 4.8, the overall mean of the mean scores were 1.9 in the range of slightly agreement interval in the 3rd program, 2.6 in the range of agreement interval in the 4th program, and 2.3 in the range of slightly agree in the 5th program. The mean scores ranged from 1.4 to 2.4 in 3rd program, from 1.7 to 2.9 in the 4th program, and from 1.9 to 2.7 in the 5th program (out of 3).

The highest mean scores in the 3rd program were related to item 5, which was the usefulness of the textbook and resources (M=2.4) and item 11, which was about the measurement of the participants' knowledge level sufficiently with exam questions (M=2.3). The lowest mean scores in the 3rd program were related to item 3, which was about the difficulty of the course subject (M=1.4), and item 6, which was about the sufficiency of the examples (M=1.7).

The highest mean scores in the 4th program were related to item 11 (M=2.9), and item 13, which was about the increasing participants' interest to the subject of course (M=2.9). The lowest mean scores in the 4th program were related to item 3 as indicated in the 3rd program (M=2.0), and item 4, which was about often finding often mistakes in the course notes (M=2.3).

The highest mean scores in the 5th program was related to item 4 as indicated in the 4th program (M=2.7). The lowest mean scores in the 5th program were related to item 3 as indicated in the 3rd program (M=1.9), and item 6 (M=2.0) as indicated in the 3rd program. The percentages of participants who disagreed and slightly agreed on item 4, which was about often finding mistakes in the course

notes, was 54.2 % in the 3rd program, 50.8 % in the 4th program, and 95.8 % in the 5th program.

Furthermore, the percentages of participants who agreed on all other items increased steeply from the 3rd program to the 4th program, but decreased slightly from the 4th program to the 5th program. For example, the percentages of participants who agreed on item 1, which was about the fluency and clearance of the course notes, were 25 % in the 3rd program, 76.9 % in the 4th program, 41.2 % in the 5th program and item 9, which was about the helpfulness of the exercises for understanding the subject, were 33.3 % in the 3rd program, 83.1 % in the 4th program, 59.4 % in the 5th program and item 13 were 29.2 % in the 3rd program, 90.8 % in the 4th program, and 61.3 % in the 5th program.

In conclusion, although the perceptions of participants were slightly or less positive in the 3rd program, it changed to be more positive in the 4th program. However, it decreased a little again in the 5th program.

Table 4.8: The participants' perception of the Operating Systems with Unix Course effectiveness

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
1) The course notes were fluent and clear	25,0	25,0	50,0	24	1.8	76,9	13,8	9,2	65	2.7	41,2	35,3	23,5	34	2.2
2) The course notes were satisfying	41,7	8,3	50,0	24	1.9	56,9	24,6	18,5	65	2.4	30,3	51,5	18,2	33	2.1
3) The course subject was difficult	66,7	29,2	4,2	24	1.4	58,5	15,4	26,2	65	1.7	35,3	41,2	23,5	34	1.9
4) I often found mistakes in the course notes	45,8	16,7	37,5	24	1.9	49,2	15,4	35,4	65	1.9	6,3	18,8	75,0	32	2.7
5) The textbook and resources were useful	58,3	20,8	20,8	24	2.4	86,2	12,3	1,5	65	2.8	58,1	25,8	16,1	31	2.4
6) The examples were sufficient	29,2	8,3	62,5	24	1.7	61,5	16,9	21,5	65	2.4	30,3	36,4	33,3	33	2.0
7) The examples were helpful in understanding the subject	29,2	29,2	41,7	24	1.9	75,4	15,4	9,2	65	2.7	40,6	53,1	6,3	32	2.3
8) The multimedia applications were sufficient	41,7	20,8	37,5	24	2.0	76,9	18,5	4,6	65	2.7	57,6	30,3	12,1	33	2.5
9) The exercises were helpful in understanding the subject	33,3	20,8	45,8	24	1.9	83,1	13,8	3,1	65	2.8	59,4	34,4	6,3	32	2.5
10) The homeworks were helpful in learning the subject	41,7	16,7	41,7	24	2.0	83,1	7,7	9,2	65	2.7	59,4	34,4	6,3	32	2.5
11) The exam questions sufficiently measured our knowledge level	54,2	25,0	20,8	24	2.3	89,2	7,7	3,1	65	2.9	44,8	37,9	17,2	29	2.3
12) I learned the subjects explained in the course	41,7	25,0	33,3	24	2.1	76,9	18,5	4,6	65	2.7	53,1	34,4	12,5	32	2.4
13) The course increased my interest to the subject	29,2	37,5	33,3	24	2.0	90,8	6,2	3,1	65	2.9	61,3	19,4	19,4	31	2.4
Average of the means:					1.9					2.6					2.3

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

Perceptions about second semester's courses from open-ended part of questionnaire:

The followings are the analysis of written perceptions of the 3rd, 4th and 5th programs' participants about the courses which are Data Structure and Algorithms and Operating Systems with Unix given in the second semester of online ITCPs.

Although two of the 4th and one of the 5th program's participants stated the way of giving courses were satisfying, analysis revealed that the general perceptions of participants about the courses given in the second semester were slightly positive.

Some participants thought that both courses notes in the second semester were not satisfying and the examples were not sufficient. For example, one of the 3rd, six of the 4th, and ten of the 5th program's participants stated that the contents of course notes should comprise more examples, exercises and detailed information. Also, five of them added that it should consist of more applications and practical examples. Furthermore, from the viewpoint of the number of examples in the course notes, it was expressed by two of the 3rd, two of the 4th, and one 5th program's participants that the numbers of examples in the course notes were not enough. Moreover, seven of the 3rd, one of the 4th, and one of the 5th program's participants stated that Operating Systems with Unix course notes were insufficient and two participants from the 3rd program stated that Operating Systems with Unix notes should be more instructive. Furthermore, one participant from 5th program expressed that the course topics should be more related to real life and one participant expressed that "I don't expect Operating Systems with Unix course topics which is about hardware of computer"

In addition, four of the 3rd, one of the 4th, and one of the 5th program's participants thought that the topics of courses were too compact, the semesters in the program were too short and the flow of courses was very fast. Two of the 3rd and one of the 4th programs' participants mentioned that the topics of course

notes were disorganized because the topic of course notes were not distributed equally in each week.

Moreover, some of the participants thought that the second semester courses were more difficult. For example, three participants from the 3rd program wrote "Our prerequisite knowledge was not enough for taking these courses" and one participant stated that "These courses were difficult for me". Two participants from the 3rd program pointed out that "this course should be given as an advanced course of the Computer Systems and Structures course".

One of the lowest mean scores in second semester was related to again item 4, which was about often finding mistakes in the course notes. For instance, five of the 3rd, two of the 4th, and three of the 5th program's participants confirmed that the language used in the course notes was incomprehensible, and there were some spelling and grammar errors in the notes. For example, one participant from 4th program expressed that the programs in the Data Structure and Algorithms course notes should be run correctly

Some of the participants requested that the multimedia applications should be more. Two of the 3rd, one of the 4th, and two of the 5th program's participants expressed that "The course should be more visual and it should have more animations and applets".

In addition, one participant from the 4th program and one participant from the 5th program stated that instructors should advise to the participants about topics at the end of the course to improve themselves. One participant from the 3rd program stated that some questions should be asked to the participants to research more topics. Also, two participants from the 3rd program pointed out that we need Unix operating system to run and study examples and programs, and the server given was insufficient.

Regarding to the 3rd, 4th, and 5th participant's perceptions about homeworks in the second semester courses, one of the 4th and one of the 5th program's

participants suggested that the homeworks should be given in each week. Two of the 4th program's participants expressed that "The homeworks were very difficult and number of homeworks were not enough. They were not instructive." and one of the 5th program's participants suggested that the homeworks' answers and results should be declared in a short time and one participant stated that "exercises was not as important as homeworks for the instructors and participants". One of the 4th program's participants stated that "the homeworks could de done by a group of participants".

In addition, one of the 3rd program's participants stated that the homeworks should be not in the assessment criteria or affect in a minor way and doing homeworks should be not compulsory. Two of the 4th program's participants expressed that "The homeworks given can not be cheated".

Regarding to the 3rd, 4th and 5th participants' perceptions about the exams in the second semester courses, two of the 5th program's participants mentioned that the participants should be informed about exam before it. For example, examples or exercises about the exams should be given. One of the 5th program's participants expressed that the evaluation method and questions types in the exams were not suitable.

4.2.5 The perceptions of participants about the effectiveness of the Software Engineering course in online ITCPs (Research Question 2.5)

The perceptions of the 3rd, 4th and 5th programs' participants about the effectiveness of the Software Engineering course in online ITCPs were the fifth sub-question of research question 2. The questions and answers with percentages are given in Table 4.9

As shown in Table 4.9, the overall mean of the mean scores were 2.6 that was in the agreement interval in the 3rd program, 2.5 that was in the agreement interval in the 4th program and 2.1 that was in the slightly agreement interval in the 5th

program. The mean scores ranged from 1.4 to 2.8 in the 3rd program, from 1.8 to 3.0 in the 4th program, and from 1.5 to 2.5 in the 5th program.

The highest mean scores in the 3rd program were related to item 5, which was the usefulness of the textbook and resources (M=2.8), item 8, which was the sufficiency of the multimedia applications, item 9, which was about the helpfulness of the exercises for understanding the subject (M=2.8), and item 10, which was about the helpfulness of the homeworks in learning the subject (M=2.8). The lowest mean scores in the 3rd program was related to item 3, which was about the difficulty of the course subject (M=1.4), and item 4, which was about often finding mistakes in the course notes (M=2.1).

The highest mean scores in the 4th program were related to item 12, which was about learning the subject (M=2.9), and item 13, which was about the increasing participants' interest to the subject of course (M=3.0). The lowest mean scores in the 4th program were related to item 3 (M=1.8), and item 4 (M=1.9) as indicated in the 3rd program.

The highest mean score in the 5th program was related to item 10, which was about the helpfulness of the homeworks in learning the subject (M=2.7). The lowest mean scores in the 5th program were related to item 6 (M=1.5) and item 8 as indicated in the 3rd program (M=1.8).

Furthermore, the percentages of participants who agreed on items 1, 2, 6, 8, and item 9 decreased from the 3rd program to 5th program. For example, the percentages of the participants who agreed or slightly agreed on item 1, which was about the fluency and clearance of the course notes, were 73.2 % in the 3rd program, 65.3 % in the 4th program, 38.2 % in the 5th program, and item 6, which was about the sufficiency of the examples, were 58.9 % in the 3rd program, 53.1 % in the 4th program, and 10.0 % in the 5th program.

Moreover, the percentages of the participants who agreed on some items increased slightly from the 3rd program to the 4th program, but decreased from

the 4th program to the 5th program. These items were items 3, 4, 5, 7, 10, 12, and 13. For example, the percentages of the participants who agreed on item 5 were 75.0 % in the 3rd program, 85.7 % in the 4th program, and 51.9 % in the 5th program and item 12 were 75 % in the 3rd program, 89.4 % in the 4th program, and 33.3 % in the 5th program.

In conclusion, the positive perceptions of the participants were decreasing from the 3rd program to 5th program about effectiveness of Software Engineering Course.

Table 4.9: The participants' perception of the Software Engineering Course effectiveness

	3rd Program					4th Program					5th Program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
1) The course notes were fluent and clear	73,2	17,9	8,9	56	2,7	65,3	24,5	10,2	49	2,3	38,2	32,4	29,4	34	2,1
2) The course notes were satisfying	80,4	17,9	1,8	55	2,7	65,3	24,5	10,2	49	2,3	27,3	42,4	30,3	33	2,0
3) The course subject was difficult	51,8	23,2	25,0	56	1,4	53,1	12,2	34,7	49	1,8	31,3	28,1	40,6	32	2,1
4) I often found mistakes in the course notes	37,5	19,6	42,9	53	2,1	44,9	14,3	40,8	49	1,9	34,5	20,7	44,8	29	2,1
5) The textbook and resources were useful	75,0	16,1	8,9	56	2,8	85,7	12,2	2,0	49	2,8	51,9	37,0	11,1	27	2,4
6) The examples were sufficient	58,9	16,1	25,0	56	2,5	53,1	28,6	18,4	49	2,3	10,0	26,7	63,3	30	1,5
7) The examples were helpful in understanding the subject	69,6	19,6	10,7	56	2,7	73,5	22,4	4,1	49	2,7	34,5	55,2	10,3	29	2,2
8) The multimedia applications were sufficient	75,0	14,3	10,7	56	2,8	63,3	22,4	14,3	49	2,5	25,9	29,6	44,4	27	1,8
9) The exercises were helpful in understanding the subject	87,5	10,7	1,8	56	2,8	81,6	14,3	4,1	49	2,8	37,9	41,4	20,7	29	2,2
10) The homeworks were helpful in learning the subject	87,5	3,6	8,9	56	2,8	93,9	2,0	4,1	49	2,9	61,3	32,3	6,5	31	2,5
11) The exam questions sufficiently measured our knowledge level	83,9	8,9	7,1	56	2,7	83,7	8,2	8,2	49	2,6	53,3	33,3	13,3	30	2,4
12) I learned the subjects explained in the course	75,0	17,9	7,1	56	2,7	89,4	10,6	0,0	49	2,9	33,3	53,3	13,3	30	2,2
13) The course increased my interest to the subject	83,9	7,1	8,9	56	2,7	89,4	8,5	2,1	49	3,0	61,3	19,4	19,4	31	2,4
Average of the means:					2,6					2,5					2,1

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.2.6 The perceptions of participants about the effectiveness of the Database Management Systems course in online ITCPs (Research Question 2.6)

The perceptions of the 3rd, 4th and 5th programs' participants about the effectiveness of the Database Management Systems course in online ITCPs were the sixth sub-question of research question 2. To collect relevant data 13 questions were asked. The questions and answers with percentages are given in Table 4.10.

As shown in Table 4.10, the overall mean of the mean scores were 2.6 in the range of agreement interval in the 3rd program, 2.5 in the range of agreement interval in the 4th program and 2.1 in the range of slightly agreement interval in the 5th program. The mean scores ranged from 1.4 to 2.8 in the 3rd program, from 1.8 to 3.0 in the 4th program, and from 1.5 to 2.6 in the 5th program.

The highest mean scores in the 3rd program were related to item 5, which was the usefulness of the textbook and resources, item 8, which was the sufficiency of the multimedia applications, item 9, which was about the helpfulness of the exercises for understanding the subject and item 10, which was about the helpfulness of the homeworks in learning the subject (M=2.8). The lowest mean scores in the 3rd program were related to item 3, which was about the difficulty of the course subject (M=1.4), and item 4, which was about often finding mistakes in the course notes (M=2.1).

The highest mean score in the 4th program was related to item 13, which was about the increasing participants' interest to the subject of course (M=3.0). The lowest mean scores in the 4th program were related to item 3 (M=1.8), and item 4 (M=1.9) again.

The highest mean scores in the 5th program were related to item 5 and item 13 as indicated in the 4th program (M=2.6). The lowest mean scores in the 5th program were related to item 2, which was about satisfaction from the course notes, and item 3 (M=1.8) again.

Furthermore, the percentage of the participants who agreed on items 1, 2, 3, 6, 7, 8, 9 and 11 decreased from the 3rd program to the 5th program. For example, the percentage of the participants who agreed on item 2 were 74.5 % in the 3rd program, 51 % in the 4th program, and 21.2 % in the 5th program and item 8 were 87.5 % in the 3rd program, 67.3 % in the 4th program, 37.9 % in the 5th program.

Moreover, the percentage of the participants who agreed on many items increased slightly from the 3rd program to 4th program, but decreased from the 4th program to 5th program again. These items were items 4, 5, 10, 12, and 13. For example, the percentage of the participants who agreed on item 10, which was about the helpfulness of the homeworks in learning the subject, was 85.7 % in the 3rd program, 93.9 % in the 4th program, 64.5 % in the 5th program.

In conclusion, the positive perceptions of the participants were decreasing from the 3rd program to the 5th program about effectiveness of the Database Management Systems course.

Table 4.10: The participants' perception of the Database Management Systems Course effectiveness

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
1) The course notes were fluent and clear	76,8	17,9	5,4	56	2,7	57,1	20,4	22,4	49	2,3	32,4	29,4	38,2	34	1,9
2) The course notes were satisfying	74,5	18,2	7,3	55	2,7	51,0	26,5	22,4	49	2,3	21,2	39,4	39,4	33	1,8
3) The course subject was difficult	57,1	8,9	33,9	56	1,4	53,1	16,3	30,6	49	1,8	46,9	31,3	21,9	32	1,8
4) I often found mistakes in the course notes	39,6	15,1	45,3	53	2,1	46,9	18,4	34,7	49	1,9	30,0	26,7	43,3	30	2,1
5) The textbook and resources were useful	82,1	12,5	5,4	56	2,8	83,7	14,3	2,0	49	2,8	64,3	28,6	7,1	28	2,6
6) The examples were sufficient	73,2	7,1	19,6	56	2,5	57,1	20,4	22,4	49	2,3	6,3	40,6	53,1	32	1,5
7) The examples were helpful in understanding the subject	76,8	19,6	3,6	56	2,7	73,5	22,4	4,1	49	2,7	30,0	40,0	30,0	30	2,0
8) The multimedia applications were sufficient	87,5	5,4	7,1	56	2,8	67,3	18,4	14,3	49	2,5	37,9	31,0	31,0	29	2,1
9) The exercises were helpful in understanding the subject	89,3	3,6	7,1	56	2,8	83,7	16,3	0,0	49	2,8	48,4	25,8	25,8	31	2,2
10) The homeworks were helpful in learning the subject	85,7	3,6	10,7	56	2,8	93,9	2,0	4,1	49	2,9	64,5	25,8	9,7	31	2,5
11) The exam questions sufficiently measured our knowledge level	83,9	5,4	10,7	56	2,7	75,5	8,2	16,3	49	2,6	45,2	41,9	12,9	31	2,3
12) I learned the subjects explained in the course	76,8	19,6	3,6	56	2,7	93,9	6,1	0,0	49	2,9	41,9	45,2	12,9	31	2,3
13) The course increased my interest to the subject	82,1	7,1	10,7	56	2,7	95,9	4,1	0,0	49	3,0	68,8	18,8	12,5	32	2,6
Average of the means:					2,6					2,5					2,1

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

Perceptions about third semester's courses from open-ended part of questionnaire:

The followings are the analysis of written perceptions of the 3rd, 4th and 5th programs' participants about the courses which were the Software Engineering and Database Management Systems Course given in the third semester of online ITCPs.

Analysis revealed that the positive perceptions of the 3rd, 4th, and 5th programs' participants about courses given in the third semester decreased. Moreover, three of the 3rd, two of the 4th, and two of the 5th program's participants stated the way of giving courses were satisfying. Two of the 3rd program's participants wrote that this program reached the aim and one participant from 4th program expressed that "I was satisfied with the courses"

However, some of the participants mentioned that they were not satisfied with the course notes. One of the 3rd, one of the 4th, and six of the 5th program's participants stated that the contents of course notes should comprise more examples, exercises. Also, one participant from the 3rd program and one participant from the 4th program expressed that it should consist of more applications and practical examples. In addition, one participant from the 3rd program and one participant from the 4th program stated that the course notes were insufficient and one participant from the 5th program pointed out that this course was too boring. It should be more interesting. Three of the 3rd program's participants thought that the topics of courses were too compact, the semesters in the program were too short and the flow of courses was very fast. Two of the 3rd program's participants and two of the 4th program's participants stated that the course should be more understandable and instructive, and one participant from the 3rd program stated that the courses were difficult.

In addition, some of the participants stated that they had some difficulties with the language of course notes. For examples, four of the 3rd, five of the 4th, and seven of the 5th program's participants confirmed that the language used in the course notes was incomprehensible, and there were some spelling and grammar

errors in the notes. Also, one of the 3rd, one of the 4th, and four of the 5th program's participants stated that they had some difficulties in understanding some concepts in the course notes because they sometimes needed the mean of concept in English.

Furthermore, some of the participants wanted to see more animations in the course notes. For example, one of the 3rd, and two of the 5th program's participants expressed that more animations for the course notes should be prepared.

Regarding to the 3rd, 4th and 5th programs' participant writings about homeworks and exams in the third semester courses, one of the 3rd, one of the 4th, and one of the 5th program's participants expressed that more homeworks should be given. Also, one of the 5th program's participants stated that the numbers of homeworks were not enough and they were too difficult. Three of the 5th program's participants suggested that the homeworks' answers and results should be declared in a short time and two participants stated that more time should be given for doing homeworks. One of the 3rd program's participants stated that there was no standard in the homeworks. Some of them were too difficult or too easy.

In addition, one of the 3rd and one of the 4th program's participants said that the exams' questions and answers should be exposed to the participants after exams. One of the 3rd program's participants mentioned that the participants should be informed about exams' questions before it. One of the 5th program's participants expressed that the evaluation method and questions types in the exam were not suitable and one participant expressed that time given in the exams was not enough.

4.2.7 The perceptions of participants about the effectiveness of the Computer Networks course in online ITCPs (Research Question 2.7)

The perceptions of the 3rd, 4th and 5th programs' participants about the effectiveness of the Computer Networks course in online ITCPs were the seventh sub-question of research question 2. The questions and answers with percentages are given in Table 4.11.

As shown in Table 4.11, the overall mean of the mean scores were 2.6 in the range of agreement interval in the 3rd program, 2.6 in the range of agreement interval in the 4th program, and 2.3 in the range of slightly agreement interval in the 5th program. The mean scores ranged from 1.4 to 2.9 in the 3rd program, from 1.5 to 2.9 in the 4th program, and from 1.9 to 2.6 in the 5th program.

The highest mean scores in the 3rd program were related to items 5, 9, and 12 (M=2.9). The lowest mean scores in the 3rd program was related to item 3 (M=1.4), and item 4 (M=2.0). Also, the highest mean scores in the 4th program were related to item 5, item 11, and item 13 (M=2.9). The lowest mean scores in the 4th program were related to item 3, and item 4 (M=1.7). In addition, the highest mean scores in the 5th program were related to item 5 and item 13 (M=2.6). The lowest mean scores in 5th program were related to item 3 (M=1.9), and item 4 (M=2.1).

Furthermore, the percentages of the participants who agreed on items 1, 2, 7, 8 and 12 decreased from the 3rd program to 5th program. For example, the percentages of the participants who agreed or slightly agreed on item 8, which was the sufficiency of the multimedia applications, were 81.1 % in the 3rd program, 76.6 % in the 4th program, 50 % in the 5th program, and item 12, which was about learning the subject, were 91.9 % in the 3rd program, 85.1 % in the 4th program, 37.5 % in the 5th program.

Moreover, the percentages of the participants who agreed on some items increased little from the 3rd program to 4th program, but decreased from the 4th

program to 5th program. These items were items 3, 4, 5, 6, 10, 11, and 13. For example, the percentages of the participants who agreed or slightly agreed on item 10, which was about the helpfulness of the homeworks in learning the subject, were 81.1 % in the 3rd program, 87.2 % in the 4th program, 50 % in the 5th program.

In conclusion, the positive perceptions of the participants nearly the same or increased little from the 3rd program and to the 4th program, but it decreased again in the 5th program in regard to Computer Network course effectiveness.

Table 4.11: The participants' perception of the Computer Networks Course effectiveness

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
1) The course notes were fluent and clear	83,8	13,5	2,7	37	2,8	72,3	12,8	14,9	47	2,6	50,0	33,3	16,7	18	2,3
2) The course notes were satisfying	73,0	18,9	8,1	37	2,6	70,2	10,6	19,1	47	2,5	41,2	35,3	23,5	17	2,2
3) The course subject was difficult	62,2	16,2	21,6	37	1,4	66,0	14,9	19,1	47	1,5	41,2	29,4	29,4	17	1,9
4) I often found mistakes in the course notes	40,5	16,2	43,2	37	2,0	57,4	12,8	29,8	47	1,7	23,5	47,1	29,4	17	2,1
5) The textbook and resources were useful	89,2	8,1	2,7	37	2,9	93,6	2,1	4,3	47	2,9	68,8	25,0	6,3	16	2,6
6) The examples were sufficient	69,2	20,5	10,3	39	2,6	72,3	10,6	17,0	47	2,6	25,0	50,0	25,0	16	2,0
7) The examples were helpful in understanding the subject	86,5	10,8	2,7	37	2,8	83,0	12,8	4,3	47	2,8	56,3	25,0	18,8	16	2,4
8) The multimedia applications were sufficient	81,1	13,5	5,4	37	2,8	76,6	10,6	12,8	47	2,6	50,0	25,0	25,0	16	2,3
9) The exercises were helpful in understanding the subject	88,9	11,1	0,0	36	2,9	87,2	8,5	4,3	47	2,8	50,0	43,8	6,3	16	2,4
10) The homeworks were helpful in learning the subject	81,1	10,8	8,1	37	2,7	87,2	8,5	4,3	47	2,8	50,0	50,0	0,0	16	2,5
11) The exam questions sufficiently measured our knowledge level	86,5	5,4	8,1	37	2,8	87,2	10,6	2,1	47	2,9	62,5	12,5	25,0	16	2,4
12) I learned the subjects explained in the course	91,9	8,1	0,0	37	2,9	85,1	10,6	4,3	47	2,8	37,5	50,0	12,5	16	2,3
13) The course increased my interest to the subject	89,2	5,4	5,4	37	2,8	93,3	2,2	4,4	45	2,9	62,5	31,3	6,3	16	2,6
Sub scale mean scores	Average of Mean:				2,6	Average of Mean:				2,6	Average of Mean:				2,3

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.2.8 The perceptions of participants about the effectiveness of the Software Development Project course in online ITCPs (Research Question 2.8)

The perceptions of the 3rd, 4th and 5th programs' participants about the effectiveness of the Software Development Project course in online ITCPs were the eighth sub-question of research question 2. The questions and answers with percentages are given in Table 4.12.

As shown in Table 4.12, the overall mean of the mean scores were 2.6 in the range of agreement interval in the 3rd program, 2.7 in the range of agreement interval in the 4th program and 2.2 in the range of slightly agreement interval in the 5th program. The mean scores ranged from 1.5 to 2.9 in the 3rd program, from 1.3 to 3.0 in the 4th program, and from 1.4 to 2.6 in the 5th program.

The highest mean scores in the 3rd program was related to items 5, 9, 12, and 13 (M=2.9). The lowest mean scores in the 3rd program was related to item 3 (M=1.5). Also, the highest mean scores in the 4th program were related to items 7, 9, 10, 11, and 13 (M=3.0). The lowest mean scores in the 4th program were related to item 3 (M=1.3), and item 4 (M=1.8). The highest mean scores in the 5th program were related to item 1 (M=1.4) and item 13 (M=2.6). In addition, the lowest mean scores in the 5th program were related to item 3 (M=1.4).

Furthermore, the percentages of the participants who agreed on most of the items increased from the 3rd program to 4th program, but decreased from the 4th program to 5th program. For example, the percentages of the participants who agreed on item 1 were 81.1 % in the 3rd program, 93.6 % in the 4th program, and 72.2 % in the 5th program and item 2 were 70.3 % in the 3rd program, 89.4 % in the 4th program, and 41.2 % in the 5th program.

In conclusion, the positive perceptions of participants increased from the 3rd program and to 4th program, but it decreased in the 5th program in regard to Software Development Project course effectiveness.

Table 4.12: The participants' perception of the Software Development Project Course effectiveness

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
1) The course notes were fluent and clear	81,1	18,9	0,0	37	2.8	93,6	4,3	2,1	47	2,9	72,2	16,7	11,1	18	2,6
2) The course notes were satisfying	70,3	16,2	13,5	37	2.6	89,4	2,1	8,5	47	2,8	41,2	23,5	35,3	17	2,1
3) The course subject was difficult	60,6	24,2	15,2	33	1.5	79,2	10,4	10,4	48	1,3	64,7	29,4	5,9	17	1,4
4) I often found mistakes in the course notes	46,3	12,2	41,5	41	2.0	59,6	2,1	38,3	47	1,8	18,8	12,5	68,8	16	2,5
5) The textbook and resources were useful	89,2	8,1	2,7	37	2.9	95,7	0,0	4,3	47	2,9	60,0	13,3	26,7	15	2,3
6) The examples were sufficient	68,4	21,1	10,5	38	2.6	85,1	8,5	6,4	47	2,8	40,0	6,7	53,3	15	1,9
7) The examples were helpful in understanding the subject	86,5	10,8	2,7	37	2.8	95,7	4,3	0,0	47	3,0	40,0	20,0	40,0	15	2,0
8) The multimedia applications were sufficient	64,9	18,9	16,2	37	2.5	87,2	4,3	8,5	47	2,8	40,0	13,3	46,7	15	1,9
9) The exercises were helpful in understanding the subject	94,6	5,4	0,0	37	2.9	100	0,0	0,0	47	3,0	46,7	20,0	33,3	15	2,1
10) The homeworks were helpful in learning the subject	83,8	10,8	5,4	37	2.8	100	0,0	0,0	47	3,0	57,1	14,3	28,6	14	2,3
11) The exam questions sufficiently measured our knowledge level	83,8	5,4	10,8	37	2.7	97,9	2,1	0,0	47	3,0	50,0	28,6	21,4	14	2,3
12) I learned the subjects explained in the course	91,9	5,4	2,7	37	2.9	93,6	6,4	0,0	47	2,9	57,1	28,6	14,3	14	2,4
13) The course increased my interest to the subject	94,6	5,4	0,0	37	2.9	97,9	2,1	0,0	47	3,0	64,3	35,7	0,0	14	2,6
Average of the means:					2,6					2,7					2,2

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

Perceptions about fourth semester's courses from open-ended part of questionnaire:

The followings are the analysis of written perceptions of the 3rd, 4th and 5th programs' participants about the courses which are Computer Networks course and Software Development Project course given in the fourth semester of online ITCPs.

Analysis revealed that the general perceptions of the 3rd, 4th programs' participants about courses given in the fourth semester were positive, but it was less positive in 5th programs' participants. Moreover, one of the 3rd and one of the 5th program's participants stated the way of giving courses were satisfying. One of the 3rd program's participants wrote that "I was satisfied with the courses"

However, one of the 3rd, two of the 4th, and one of the 5th program's participants stated that the contents of course notes should comprise more examples, exercises and detailed information. Also, one participant from the 5th program expressed that it should consist of more applications and practical examples. One of the 3rd program's participants thought that the topics of courses were too compact, the semesters in the program were too short and the flows of courses were very fast.

In addition, three of the 3rd, one of the 5th program's participants confirmed that the language used in the course notes was incomprehensible, and there were some spelling and grammar errors in the notes. One of the 3rd program's participants expressed that the course should be more visual and one of the participants stated that it should be given more resources, such as, references, links. One of the 3rd program's participants stated that participants should work too hard to success. One of the 5th program's participants stated that the courses should be difficult.

Regarding to the 3rd, 4th and 5th programs' participants writing about Software Development Project courses, one of the 3rd, one of the 4th, and one of the 5th

program's participants stated that the time given for course was not enough. It should be more. One of the 4th program's participant stated Software Engineering course and Software Development Project Course should be given in the same semester

Regarding to the 3rd, 4th and 5th participant's writing about Computer Networks course's exam, two of the 3rd program's participants stated that the exams' questions and answers should be exposed to the participants after exam. One of the 3rd program's participants mentioned that the participants should be informed before exams' questions.

4.3 The perceptions of participants about learner support in online ITCPs (Research Question 3):

The perception of the 3rd, 4th and 5th programs' participants about learner support in online ITCPs is the third main question. To collect relevant data 2 questions were asked for each sub-question.

4.3.1 The perceptions of participants about the learner support of Computer Systems and Structures course in online ITCPs (Research Question 3.1):

The perceptions of the 3rd, 4th and 5th programs' participants about the learner support of Computer Systems and Structures course in online ITCPs were the first sub-question of research question 3. The questions and answers with percentages are given in Table 4.13

As seen in Table 4.13, the overall mean of the mean scores were 2.9 in agreement interval in the 3rd, and 4th programs and 2.8 in agreement interval in 5th program (out of 3). Approximately 90 % of 3rd and 4th programs' participants agreed that the instructor and assistant helped them when they were confused. This ratio decreased slightly to the approximately 80 % in the 5th program. It is seen that the perceptions of the 3rd, 4th and 5th programs' participants about the learner support of Computer Systems and Structures course was quite positive.

Table 4.13: The participants' perceptions about the learner support of Computer Systems and Structures course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
14) The instructor helped me when I was confused	88,9	8,3	2,8	36	2.9	90,7	7,0	2,3	86	2.9	80,0	16,7	3,3	60	2.8
15) The assistant helped me when I was confused	91,7	5,6	2,8	36	2.9	91,9	4,7	3,5	86	2.9	83,3	13,3	3,3	60	2.8
Average of the means:					2.9					2.9					2.8

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.3.2 The perceptions of participants about the learner support of Introduction to Computer Programming with C course in online ITCPs (Research Question 3.2):

The perceptions of the 4th and 5th programs' participants about learner support of Introduction to Computer Programming with C course in online ITCPs were the second sub-question of research question 3. The questions and answers with percentages are given in Table 4.14

As seen in Table 4.14, the overall mean of the mean scores were 2.9 in the range of agreement interval in the 4th and 5th programs. 89.5 % of the 4th programs' participants and 88.3 % of the 5th program's participants agreed that the instructor helped them when they were confused. Furthermore, 90.7 % of the 4th programs' participants and 93.3 % of the 5th program's participants agreed that the assistant helped them when they were confused. In conclusion, the perceptions of the 4th and 5th program's participants about the learner support of Introduction to Computer Programming with C course were quite positive.

Table 4.14: The participants' perceptions about learner support of Introduction to Computer Programming with C course

	4th program					**5th program**				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
14) The instructor helped me when I was confused	89,5	9,3	1,2	86	2.9	88,3	5,0	6,7	60	2.8
15) The assistant helped me when I was confused	90,7	7,0	2,3	86	2.9	93,3	5,0	1,7	60	2.9
Average of the means:					2.9					2.9

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

In addition, for the first semester courses from the open ended questions, four of the 3rd programs' participants and one of the 5th programs' participants stated that "I was pleased with effort of instructors", however two of the 3rd programs' participants and one of the 4th programs' participants stated that the effort of instructors were not enough. Moreover, two of the 3rd, two of the 4th, and one of

the 5th program's participants said that the number of face to face lecture on campus should be more to get more support.

4.3.3 The perceptions of participants about the learner support of Data Structure and Algorithms course in online ITCPs (Research Question 3.3):

The perceptions of the 4th and 5th programs' participants about the learner support of Data Structure and Algorithms course in online ITCPs were the third sub-question of research question 3. The questions and answers with percentages are given in Table 4.15.

As seen in Table 4.15, the overall mean of the mean scores were 3.0 in the range of agreement interval in the 4th and 2.8 in the range of agreement interval in the 5th programs. 98.5 % of the 4th programs' participants and 79.3 % of the 5th program's participants agreed that the instructor helped them when they were confused. Also, 98.5 % of the 4th programs' participants and 75.9 % of the 5th program's participants agreed that the assistant helped them when they were confused. In conclusion, the perceptions of the 4th and 5th program's participants about the learner support of Data Structure and Algorithms course was quite positive.

Table 4.15: The participant's perceptions about learner support of Data Structure and Algorithms course

	4th program					**5th program**				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
14) The instructor helped me when I was confused	98,5	1,5	0,0	65	3.0	79,3	13,8	6,9	29	2.7
15) The assistant helped me when I was confused	98,5	1,5	0,0	65	3.0	75,9	24,1	0,0	29	2.8
Average of the means:					3.0					2.8

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.3.4 The perceptions of participants about the learner support of Operating Systems with Unix course in online ITCPs (Research Question 3.4):

The perceptions of the 3rd, 4th and 5th programs' participants about the learner support of Operating Systems with Unix course in online ITCPs were the fourth sub-question of research question 3. The questions and answers with percentages are given in Table 4.16

As seen in Table 4.16, overall mean of the mean scores were 2.4 in the range of agreement interval in the 3rd program, 2.9 in the range of agreement interval in the 4th program and 2.7 in the range of agreement interval in the 5th program (out of 3). 45.8 % of the 3rd program's participants agreed that the instructor helped them when they were confused and 75 % of the 3rd program's participants agreed that the assistant helped them when they were confused. However, 96.9 % of the 4th program's participants agreed that instructor and assistant helped them when they were confused, and approximately 75 % of the 5th program's participants agreed that instructor and assistant helped them when they were confused. It is seen that the positive perceptions of participants increased from the 3rd program to 4th program, but it decreased a little in the 5th program about the learner support of Operating Systems with Unix course.

In addition, for the second semester courses from open ended questions, two of the 3rd programs' participants stated that "I was pleased with effort of instructors", however ten of the 3rd programs' participants stated that the effort of instructors were not enough. Moreover, one of the 3rd, four of the 4th, and two of the 5th program's participants said that the number of face to face lecture on campus should be more to get more support.

Table 4.16: The participants' perceptions about learner support of Operating Systems with Unix course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
14) The instructor helped me when I was confused	45,8	12,5	41,7	24	2.0	96,9	0,0	3,1	65	2.9	75,0	17,9	7,1	28	2.7
15) The assistant helped me when I was confused	75,0	16,7	8,3	24	2.7	96,9	1,5	1,5	65	3.0	75,9	17,2	6,9	29	2.7
Average of the means:					2.4					2.9					2.7

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.3.5 The perceptions of participants about the learner support of Software Engineering course in online ITCPs (Research Question 3.5):

The perceptions of the 3rd, 4th and 5th programs' participants about the learner support of Software Engineering course in online ITCPs were the fifth sub-question of research question 3. The questions and answers with percentages are given in Table 4.17

As seen in Table 4.17, overall mean of the mean scores were 2.9 in the range of agreement interval in the 3rd, and 4th programs, and 2.4 in the range of agreement interval in the 5th program. When the participants were asked if instructors helped them when they were confused, 89.3 % of the 3rd program's participants, 83.7 % of the 4th program's participants, and 67.9 % of the 5th program's participants agreed. When the participants were asked if assistant helped them when they were confused, 89.3 % of the 3rd program's participants, 87.8 % of the 4th program's participants, and 46.4 % of the 5th program's participants agreed

It is seen that perceptions of participants were quite positive in the 3rd and 4th programs, but it decreased little in the 5th program about the learner support of Software Engineering course.

Table 4.17: The participants' perceptions about learner support of Software Engineering course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
14) The instructor helped me when I was confused	89,3	5,4	5,4	56	2,9	83,7	12,2	4,1	49	2,9	67,9	17,9	14,3	28	2,5
15) The assistant helped me when I was confused	89,3	7,1	3,6	56	2,8	87,8	8,2	4,1	49	2,9	46,4	32,1	21,4	28	2,3
Average of the means:					2,9					2,9					2.4

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.3.6 The perceptions of participants about the learner support of Database Management Systems course in online ITCPs (Research Question 3.6):

The perceptions of the 3rd, 4th and 5th programs' participants about the learner support of Database Management Systems course in online ITCPs were the sixth sub-question of research question 3. The questions and answers with percentages are given in Table 4.18.

As seen in Table 4.18, overall mean of the mean scores were 2.9 in the range of agreement interval in the 3rd, 4th programs, and 2.7 in the range of agreement interval in 5th program. 89.3 % of the 3rd program's participants, 85.7 % of the 4th program's participants, and 70 % of the 5th program's participants agreed that instructor helped them when they were confused. In addition, 89.3 % of the 3rd program's participants, 87.8 % of the 4th program's participants, and 63.3 % of the 5th program's participants agreed that assistant helped them when they were confused.

It is seen that perceptions of participants were quite positive in the 3rd and 4th programs, but it decreased little in the 5th program about the learner support of Database Management Systems course.

In addition, for the third semester courses from open ended questions, two of the 3rd and one of the 4th program's participants stated that "I was pleased with effort of instructors". One of the 3rd program's participants and one of the 4th program's participants stated that the number of face to face lecture on campus should be more to understand course topics.

Table 4.18: The participants' perceptions about learner support of Database Management Systems course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
14) The instructor helped me when I was confused	89,3	7,1	3,6	56	2,9	85,7	14,3	0	49	2,9	70,0	26,7	3,3	30	2,7
15) The assistant helped me when I was confused	89,3	5,4	5,4	56	2,8	87,8	10,2	2	49	2,9	63,3	33,3	3,3	30	2,6
Average of the means:					2,9					2,9					2.7

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.3.7 The perceptions of participants about the learner support of Computer Networks course in online ITCPs (Research Question 3.7):

The perceptions of the 3rd, 4th and 5th programs' participants about the learner support of Computer Networks course in online ITCPs were the seventh sub-question of research question 3. The questions and answers with percentages are given in Table 4.19.

As seen in Table 4.19, overall mean of the mean scores were 2.9 in the range of agreement interval in the 3rd, 4th programs and 2.8 in the range of agreement interval in the 5th program. 91.9 % of the 3rd program's participants, 91.5 % of the 4th program's participants, and 81.3 % of the 5th program's agreed that the instructor helped them when they were confused. Furthermore, 94.6 % of the 3rd program's participants, 93.6 % of the 4th program's participants, and 81.3 % of the 5th program's participants agreed that the assistant helped them when they were confused.

It is seen that perceptions of participants were quite positive in the 3rd, 4th and 5th programs about the learner support of Computer Networks course.

Table 4.19: The participants' perceptions about learner support of Computer Networks course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
14) The instructor helped me when I was confused	91,9	2,7	5,4	37	2,9	91,5	6,4	2,1	47	2,9	81,3	12,5	6,3	16	2,8
15) The assistant helped me when I was confused	94,6	2,7	2,7	37	2,9	93,6	6,4	0,0	47	2,9	81,3	12,5	6,3	16	2,8
Average of the means:					2,9					2,9					2,8

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.3.8 The perceptions of participants about the learner support Software Development Project course in online ITCPs (Research Question 3.8):

The perceptions of the 3rd, 4th and 5th programs' participants about the learner support of Software Development Project course in online ITCPs were the seventh sub-question of research question 3. The questions and answers with percentages are given in Table 4.20.

As seen in Table 4.20, overall mean of the mean scores were 2.9 in agreement interval in the 3rd program, 3.0 in agreement interval in the 4th program and 2.7 in agreement interval in the 5th program. 89.2 % of the 3rd program's participants, 100 % of the 4th program's participants, and 57.1 % of the 5th program's participants agreed that the instructor helped them when they were confused. In addition, 91.9 % of the 3rd program's participants, 97.9 % of the 4th program's participants, and 71.4 % of the 5th program's participants agreed that the assistant helped them when they were confused.

It is seen that perceptions of participants were quite positive in the 3rd and 4th programs, but it decreased a little in the 5th program about the learner support of Software Development Project course.

Table 4.20: The participants' perceptions about the learner support of Software Development Project course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
14) The instructor helped me when I was confused	89,2	5,4	5,4	37	2,8	100,0	0,0	0,0	47	3,0	57,1	28,6	14,3	14	2,4
15) The assistant helped me when I was confused	91,9	5,4	2,7	37	2,9	97,9	0,0	2,1	47	3,0	71,4	28,6	0,0	14	2,7
Average of the means:					2,9					3,0					2,6

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.4 The perceptions of participants about Computer Mediated Communication (CMC) in online ITCPs (Research Question 4):

The perceptions of the 3rd, 4th and 5th programs' participants about Computer Mediated Communication in online Information Technologies Certificate Program were the fourth main question. To collect relevant data 5 questions which were 3-point Likert type and 2 open-ended questions with checklist alternatives were asked for each sub-question. In addition, there were at least four chat sessions for each course in the programs. Each session lasted nearly two hours and each course had one discussion list. The instructor and assistant of courses managed the chat sessions and discussion lists. However, participations in the chat sessions and discussion list were less then expected in these programs. Due to the logistic difficulties, only the fifth programs participants' attendance to chat sessions and discussion list were examined. These provide meaningful information for the online communication tendencies of the participants. Attendances of 5th program participants to chat sessions and discussion list were provided in Table 4.21.

Table 4.21: The participants' attendance in chat sessions and discussion lists in the 5th program

Courses in the 5th program	**N**	**Chat Session**		**Discussion list**
		NC	Mean	ND
Computer Systems and Structures	88	103	25.7	45
Introduction to Computer Programming with C	88	103	25.7	33
Data Structures and Algorithms with C	71	73	18.3	21
Operating Systems with Unix	71	71	17.8	26
Software Engineering	57	54	13.5	16
Database Management Systems	57	65	16.3	14
Computer Networks	54	27	6.75	17
Software Development Project	54	38	7.6	27

N: Number of participants who registered and continued to the program, **NC:** Number of participants who attended to all four chat sessions, **ND:** Number of participants who attended to discussion lists

4.4.1 The perceptions of participants about Computer Mediated Communication of Computer Systems and Structures course in online ITCPs (Research Question 4.1):

The perceptions of the 3rd, 4th and 5th programs' participants about CMC of Computer Systems and Structures course in ITCPs were the first sub-question of research question 4. The questions and answers with percentages are given in Table 4.22.

According to Table 4.22, the overall mean of the mean scores were 2.8 in agreement interval in the 3rd, 4th and 5th programs. The highest mean scores in the 3rd and 5th programs were related to item 16, which was about the attendance of instructor to the all chat sessions (M=3.0), and item 17, which was about the attendance of assistant to the all chat sessions in the 4th and 5th programs (M=3.0). The lowest mean scores were related to item 19, which was about benefiting from chat sessions in the 3rd, 4th programs (M=2.6), and the 5th program (M=2.5). It is seen that the perceptions of the 3rd, 4th and 5th programs' participants about CMC of Computer Systems and Structures course was quite positive.

Table 4.22: The participants' perceptions about Computer Mediated Communication of Computer Systems and Structures course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
16) The instructor attended all the chat sessions	97,2	2,8	0,0	36	3.0	93,0	4,7	2,3	86	2.9	95,0	5,0	0,0	60	3.0
17) The assistant attended all the chat sessions	88,9	8,3	2,8	36	2.9	97,7	2,3	0,0	86	3.0	100, 0	0,0	0,0	60	3.0
18) I got the satisfied answers when I ask questions through e-mail	77,8	19,4	2,8	36	2.8	89,5	9,3	1,2	86	2.9	88,3	5,0	6,7	60	2.8
19) I benefited from chat sessions	73,7	15,8	10,5	38	2.6	70,9	14,0	15,1	85	2.6	63,6	25,8	10,6	66	2.5
20) I got the satisfied answers when I ask questions through discussion list	76,3	10,5	13,2	38	2.6	84,7	9,4	5,9	85	2.8	80,3	16,4	3,3	61	2.8
Average of the means:					2.8					2.8					2.8

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.4.2 The perceptions of participants about Computer Mediated Communication of Introduction to Computer Programming with C course in online ITCPs (Research Question 4.2):

The perceptions of the 4th and 5th programs' participants about CMC of Introduction to Computer Programming with C course in online ITCPs were the second sub-question of research question 4. The questions and answers with percentages are given in Table 4.23

As seen in Table 4.23, the overall mean of the mean scores were 2.8 in agreement interval in the 4th and 5th programs. The highest mean scores in the 4th and 5th programs was related to item 17, which was about the attendance of assistant to the all chat sessions (M=3.0) and item 16, in the 5th programs which was about the attendance of instructor to the all chat sessions (M=3.0). The lowest mean scores were related to item 19, which was about benefiting from chat sessions in the 4th program (M=2.5) and in the 5th program (M=2.6). In conclusion, the perceptions of the 4th and 5th program's participants about CMC of Introduction to Computer Programming with C course were quite positive.

Table 4.23: The participants' perceptions about Computer Mediated Communication of Introduction to Computer Programming with C course

	4th program					**5th program**				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
16) The instructor attended all the chat sessions	94,2	4,7	1,2	86	2.9	95,0	5,0	0,0	60	3.0
17) The assistant attended all the chat sessions	97,7	2,3	0,0	86	3.0	100,0	0,0	0,0	60	3.0
18) I got the satisfied answers when I ask questions through e-mail	91,9	8,1	0,0	86	2.9	93,3	0,0	6,7	60	2.9
19) I benefited from chat sessions	67,4	12,8	19,8	86	2.5	67,2	21,3	11,5	61	2.6
20) I got the satisfied answers when I ask questions through discussion list	84,7	9,4	5,9	85	2.8	83,6	9,8	6,6	61	2.8
Average of the means:					2.8					2.8

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

The reasons of the not attending the chat sessions in the first semester:

The followings are the reasons that show why 3rd, 4th and 5th programs' participants did not attend the chat sessions in the first semester of online ITCPs.

As seen in Table 4.24, "The time of chat sessions was not suitable" is the one of the most influential reasons that made the participants not to attend the chat sessions for 76.4 % of the 3rd, 84 % of the 4th, and 76 % of the 5th program's participants.

9.5 % of the 3rd, 4.0 % of the 4th, and 6.6 % of the 5th program's participants said that one of the reasons of attending the chat sessions that they were shy. 14.2 % of the 3rd, 12.0 % of the 4th and 16.6 % of the 5th program's participants stated that "I didn't think it may beneficial"

In addition, three of the 3rd, seven of the 4th, and eight of the 5th program's participants stated that they could not attend chat sessions because of their personal problems, for example, they didn't have much time or they didn't have a computer or Internet at home. Five of the 3rd, nine of the 4th and three of the 5th program's participants stated that the participants who attend the chat sessions discussed daily topics instead of course topics.

Two of the 3rd and one of the 5th program's participants stated that they followed to the chat log files. One of the 3rd and seven of the 4th program's participants stated that the chat sessions were not effective, because the participants who attended the chat session had different knowledge levels, the participants who had much knowledge about the topics wanted to dominate during the chat sessions.

Four of the 5th program's participants wrote that chat sessions did not provide suitable environment for learning; they could not follow the sessions because of having to write and answer at the same time. Six of the 4th program's participants said that chat sessions should be more often, and two participants from the 4th program and one participant from the 5th program said that they couldn't attend

chat sessions because of the technical problem. One of the 5th program's participants said that the attending chat sessions shouldn't be in the evaluation criteria.

In addition, in the 5th program, one participant wrote that "I have not enough knowledge to make chat", one participant wrote that chat sessions were too crowded and another participant said that "I was negatively affected in some chats; I decided not to attend the chat session". One participant said that the chat sessions should be divided in to the small groups according to participant's knowledge level.

Table 4.24: The reasons that made the participants not to attending the chat sessions

	3rd program		4th program		5th program	
	N	**%**	**N**	**%**	**N**	**%**
The time of chat session was not suitable	16	76.1	21	84.0	23	76.0
I am shy	2	9.5	1	4.0	2	6.6
I don't think it is beneficial	3	14.2	3	12.0	5	16.6

The reasons of the not attending the discussion lists in the first semester:

The followings are the reasons that show why 3rd, 4th and 5th programs' participants did not attend the discussion lists in the first semester of online ITCPs.

Two of the 4th and two of the 5th program's participants selected that "I am shy" and three of the 3rd, five of the 4th, and three of the 5th program's participants selected that "I don't think it is beneficial"

Two of the 3rd and one of the 5th program's participants stated that they didn't need to ask questions because their questions were already asked and answered by other participants. Furthermore, four of the 4th and three of the 5th program's participants stated that they didn't need discussion lists, if they had problems, they solved problems themselves.

One of the 3rd, two of the 4th, and one of the 5th program's participants stated that the structure of discussion lists should be opened to the personnel preferences of use and the arrangement of messages in the list should be more fruitful. Two of the 4th and three of the 5th program's participants stated that our questions should be answered more quickly. Furthermore, six of the 4th and four of the 5th program's participants stated that "I did not have enough time to attend the discussion lists."

One of the 3rd program's participants, one of the 4th program's participants stated that the participants who attended the discussion lists had different knowledge levels and they wanted to dominate in the discussion lists.

Furthermore, one participant from the 3rd program said that "I don't have much information to discuss the topics" and one participant from the 4th program wrote that discussion couldn't be created because unnecessary questions were asked. One participant from the 5th program mentioned that "I can not explain my problems or questions with writing because it takes much time."

4.4.3 The perceptions of participants about Computer Mediated Communication of Data Structure and Algorithms course in online ITCPs (Research Question 4.3):

The perceptions of the 4th and 5th programs' participants about CMC of Data Structure and Algorithms course in online ITCPs were the third sub-question of research question 4. The questions and answers with percentages are given in Table 4.25

As seen in Table 4.25, the overall mean of the mean scores were 2.9 in agreement interval in the 4th and 2.7 in agreement interval in the 5th programs. The highest mean scores in the 4th and 5th programs was related to item 16, which was about the attendance of instructor to the all chat sessions (M=3.0) and item 17, which was about the attendance of assistant to the all chat sessions in the 5th

programs (M=3.0). The lowest mean scores were related to item 19, which was about benefiting from chat sessions in the 4th program (M=2.6) and in the 5th program (M=2.2). In addition, the positive perceptions of participants decreased a little from the 4th program to 5th program about CMC of Data Structure and Algorithms course

Table 4.25: The participants' perceptions about Computer Mediated Communication of Data Structure and Algorithms course

	4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
16) The instructor attended all the chat sessions	98,5	1,5	0,0	65	3.0	96,4	3,6	0,0	28	3.0
17) The assistant attended all the chat sessions	98,5	1,5	0,0	65	3.0	96,4	3,6	0,0	28	3.0
18) I got the satisfied answers when I ask questions through e-mail	98,5	1,5	0,0	65	3.0	88,5	11,5	0,0	26	2.9
19) I benefited from chat sessions	73,8	10,8	15,4	65	2.6	36,0	44,0	20,0	25	2.2
20) I got the satisfied answers when I ask questions through discussion list	89,2	6,2	4,6	65	2.8	73,9	26,1	0,0	23	2.7
Average of the means:					2.9					2.7

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.4.4 The perceptions of participants about Computer Mediated Communication of Operating Systems with Unix course in online ITCPs (Research Question 4.4):

The perceptions of the 3rd, 4th and 5th programs' participants about CMC of Operating Systems with Unix course in online ITCPs were the fourth sub-question of research question 4. The questions and answers with percentages are given in Table 4.26

According to Table 4.26, the overall mean of the mean scores were 2.3 in slightly agreement interval in the 3rd, 2.9 in agreement interval in the 4th and 2.7 in agreement interval in the 5th programs. The highest mean scores in the 3rd program were related to item 20, which was about getting the satisfied answers when asking questions through discussion list (M=2.6). The highest mean scores in the 4th program item 17 which was about the attendance of assistant to the all chat sessions, and item 18 which was about getting the satisfied answers when asking questions through the e-mail (M=3.0) and item 16 which was about the attendance of instructor to the all chat sessions in the 5th program (M=3.0).

The lowest mean scores in the 3rd program was related to item 16 (M=1.7). The lowest mean score in the 4th program (M=2.3), and in the 5th program. (M=2.3) was related to item 19 which was about benefiting from chat sessions.

Five participants from the 3rd program said that the instructor of Operating Systems with Unix course didn't attend or attend too late to chat sessions and two participants said that the chat sessions of this course was not useful. Two participants from the 5th program said that the topics in the chat session of Data Structure and Algorithms course couldn't be followed because the chat sessions was directed by three instructors.

In conclusion, the positive perceptions of participants increased from the 3rd program to the 4th program, but it decreased a little in the 5th program about CMC of Operating Systems with Unix course.

Table 4.26: The participants' perceptions about Computer Mediated Communication of Operating Systems with Unix course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
16) The instructor attended all the chat sessions	16,7	33,3	50,0	24	1.7	93,8	6,2	0,0	65	2.9	96,4	3,6	0,0	28	3.0
17) The assistant attended all the chat sessions	50,0	37,5	12,5	24	2.4	98,5	1,5	0,0	65	3.0	92,9	7,1	0,0	28	2.9
18) I got the satisfied answers when I ask questions through e-mail	70,8	12,5	16,7	24	2.5	96,9	3,1	0,0	65	3.0	76,9	11,5	11,5	26	2.7
19) I benefited from chat sessions	62,5	25,0	12,5	24	2.5	76,9	9,2	13,8	65	2.6	58,3	16,7	25,0	24	2.3
20) I got the satisfied answers when I ask questions through discussion list	72,0	16,0	12,0	25	2.6	87,7	7,7	4,6	65	2.8	72,7	18,2	9,1	22	2.6
Average of the means:					2.3					2.9					2.7

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

The reasons of the not attending the chat sessions in the second semester:

The followings are the reasons that show why 3rd, 4th and 5th programs' participants did not attend chat sessions in the second semester of online ITCPs.

As seen in Table 4.27, "The time of chat session was not suitable" is the one of the most influential reasons that made the participants not to attend to the chat sessions for 58.3 % of 3rd, 78.0 % of 4th, and 76.7 % of 5th program's participants.

16.7 % of 3rd, 4.9 % of 4th, and 6.7 % of 5th program's participants said one of the reasons that they were shy, and 25 % of 3rd, 17.1 % of 4th, and 16.7 % of 5th program's participants stated they didn't think it may be beneficial.

In addition, five of the 3rd, eight of the 4th and four of the 5th program's participants stated that they could not attend chat sessions because of their personal problems, for example, they didn't have much time or their company didn't permit to them to attend chat sessions. One of the 4th program's participants stated that the participants who attended the chat sessions discuss daily topics instead of course topics. Also, one of the 3rd program's participants stated that "I had technical problem while attending chat sessions"

One of the 4th program's participants stated that they followed to the chat log files. One of 5th the program's participants stated that the chat sessions were not effective, because the participants who attended the chat sessions had different knowledge levels, the participants, who had much knowledge about the topics, wanted to dominate during the chat sessions. Three of the 4th program's participants wrote that chat sessions did not provide suitable environment for learning; they could not follow the sessions because of having to write and answer at the same time. One of the 4th program's participants said that chat sessions should be more often and the attending chat session shouldn't be in evaluation criteria and two participants said that they could not attend the chat sessions because of the technical problems.

In addition, one participant from 4th program and one participant from 5th program said that the chat sessions should be divided in to small groups according to participant's knowledge level. One participant from 4th program said that the chat sessions took too much time and one participant from 5th program said that the chat sessions should had video and voice.

Table 4.27: The reasons that made the participants not to attending chat sessions

	3rd program		4th program		5th program	
	N	**%**	**N**	**%**	**N**	**%**
The time of chat session was not suitable	7	58,3	32	78,0	23	76,7
I am shy	2	16,7	2	4,9	2	6,7
I don't think it is beneficial	3	25	7	17,1	5	16,7

The reasons of the not attending the discussion lists in the second semester:

The followings are the perceptions about discussion lists and reasons that show why the 3rd, 4th and 5th programs' participants did not attend the discussion lists in the second semester of online ITCPs.

Four of the 3rd, two of the 4th, and five of the 5th program's participants selected that "I am shy" and one of the 3rd, eight of the 4th, and one of the 5th program's participants selected that "I don't think it is beneficial"

One of the 4th program's participants said that they didn't need to ask questions because their questions were already asked and answered by other participants. One of the 5th program's participants stated that they didn't need discussion lists, if they had problems, they solved problems themselves. One of the 3rd program's participants stated that the structure of discussion lists and the arrangement of messages in the list should be more fruitful.

One of the 3rd and two of the 4th program's participants stated that our questions should be answered more quickly. Furthermore, one of the 3rd, eight of the 4th, and two of the 5th program's participants stated that "I don't have enough time to attend the discussion lists"

Furthermore, two participant from the 3rd program said that the discussion was not so useful because of asynchronous. Two participants from 3rd program, one participant from the 4th program and two participants from the 5th program wrote that they couldn't attend discussion lists or they couldn't ask question in discussion lists because they followed the topic from behind. Two participants from the 4th program mentioned that "The discussion couldn't be created and the unnecessary questions were asked." and one participant from the 5th program stated that "I asked questions directly to the assistants with e-mail"

4.4.5 The perceptions of participants about Computer Mediated Communication of Software Engineering course in online ITCPs (Research Question 4.5):

The perceptions of the 3rd, 4th and 5th programs' participants about CMC of Software Engineering course in online ITCPs were the fifth sub-question of research question 4. The questions and answers with percentages are given in Table 4.28.

According to Table 4.28, the overall mean of the mean scores were 2.8 in agreement interval in the 3rd, 4th programs and 2.4 in agreement interval in the 5th programs. Item 16 which was about the attendance of instructor to the all chat sessions, and item 17 which was about the attendance of assistant to the all chat sessions had the highest mean scores in the 3rd program (M=2.9) in the 5th program (M=3.0). Item 17 had also the highest mean scores in the 4th program (M=2.6).

The lowest mean scores were related to item 19 which was about benefiting from chat sessions in the 3rd program (M=2.4), in the 4th program (M=2.5) and in the 5th program (M=2.3). Also, the other lowest mean scores in the 5th program was item 20 which was about getting the satisfied answers when asking questions through the discussion lists (M=2.3)

In addition, two participants from the 5th program wrote that they sent messages to the discussion lists of Software Engineering course, but the reply was not enough and one participant from the 5th program the number of attending participants in the chat sessions and discussion list was insufficiently because there were no friendly environments in the course.

In conclusion, the perceptions of participants were quite positive in the 3rd and 4th programs, but it decreased a little in the 5th program about CMC of Software Engineering course.

Table 4.28: The participants' perceptions about Computer Mediated Communication of Software Engineering course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
16) The instructor attended all the chat sessions	91,1	7,1	1,8	56	2,9	93,9	4,1	2	49	3,0	66,7	20,8	12,5	24	2,5
17) The assistant attended all the chat sessions	85,7	12,5	1,8	56	2,9	100	0	0	49	3,0	75,0	8,3	16,7	24	2,6
18) I got the satisfied answers when I ask questions through e-mail	92,9	1,8	5,4	56	2,9	95,9	4,1	0	49	2,9	70,8	12,5	16,7	24	2,5
19) I benefited from chat sessions	67,9	5,4	26,8	56	2,4	63,3	20,4	16,3	49	2,5	43,8	43,8	12,5	16	2,3
20) I got the satisfied answers when I ask questions through discussion list	83,0	7,5	9,4	53	2,7	83,7	8,2	8,2	49	2,8	50,0	33,3	16,7	18	2,3
Average of the means:					2,8					2,8					2,4

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.4.6 The perceptions of participants about Computer Mediated Communication of Database Management Systems course in online ITCPs (Research Question 4.6):

The perceptions of the 3rd, 4th and 5th programs' participants about CMC of Database Management Systems course in online ITCPs were the sixth sub-question of research question 4. The questions and answers with percentages are given in Table 4.29.

According to Table 4.29, the overall mean of the mean scores were 2.8 in agreement interval in the 3rd, 4th programs and 2.7 in agreement interval in the 5th programs. Item 16 which was about the attendance of instructor to the all chat sessions, and item 17 which was about the attendance of assistant to the all chat sessions had the highest mean scores in 3rd program (M=2.9) in the 5th program (M=3.0). In addition, item 18 which was about getting the satisfied answers when asking questions through the e-mail had another highest mean scores in the 3rd program (M=2.9). Item 17 had also the highest mean scores in the 4th program (M=2.9).

The lowest mean scores were related to item 19 which was about benefiting from chat sessions in the 3rd program (M=2.4), in the 4th program (M=2.5), and item 20's mean score about getting the satisfied answers when asking questions through the discussion list were in the 5th program (M=2.3).

In conclusion, the perceptions of participants were quite positive in the 3rd and 4th programs, but it decreased a little in 5th program about CMC of Database Management Systems course.

Table 4.29: The participants' perceptions about Computer Mediated Communication Database Management Systems course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
16) The instructor attended all the chat sessions	92,9	5,4	1,8	56	2,9	98	2	0	49	3,0	88,5	7,7	3,8	26	2,8
17) The assistant attended all the chat sessions	92,9	7,1	0,0	56	2,9	100	0	0	49	3,0	88,9	7,4	3,7	27	2,9
18) I got the satisfied answers when I ask questions through e-mail	94,6	3,6	1,8	56	2,9	95,9	0	4,1	49	2,9	80,0	8,0	12,0	25	2,7
19) I benefited from chat sessions	67,9	5,4	26,8	56	2,4	63,3	24,5	12,2	49	2,5	65,0	25,0	10,0	20	2,6
20) I got the satisfied answers when I ask questions through discussion list	81,1	9,4	9,4	53	2,7	83,7	10,2	6,1	49	2,8	47,4	36,8	15,8	19	2,3
	Average of Mean:				2,8	Average of Mean:				2,8	Average of Mean:				2,7

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

The reasons of the not attending the chat sessions in the third semester:

The followings are the reasons that show why the 3rd, 4th and 5th programs' participants did not attend chat sessions in the third semester of online ITCPs.

As seen in Table 4.30, "The time of chat session was not suitable" is the one of the most influential reasons that made the participants not to attend the chat sessions for 71.4 % of the 3rd program's participants, 63.3 % of the 4th program's participants, and 80 % of 5th program's participants.

5.7 % of the 3rd, 3.3 % of the 4th, and 6.6 % of the 5th program's participants said one of the reasons that they were shy. 22.9 % of the 3rd, 33.3 % of the 4th, and 13.3 % of the 5th program's participants stated that they didn't think it may be beneficial.

In addition, twelve of the 3rd, four of the 4th, and five of the 5th program's participants stated that they couldn't attend chat sessions because of their personal problems, for example, they didn't have much time or their company didn't permit to them. Two of the 3rd and one of the 5th program's participants stated that the participants who attended the chat sessions discuss daily topics instead of course topics. Also, two of the 3rd program's participants stated that "I had technical problem while attending the chat sessions"

Three of the 3rd program's participants stated that "I was negatively affected in some chats; I decided to not attend the chat sessions". One of 4th the program's participants stated that the chat sessions were not effective. One of 4th the program's participants stated that they should study and read the course topics before the chat sessions. One of the 3rd program's participants said that chat sessions should be more often. One participant from 5th program said that the chat sessions took too much time and one participant from 5th program said that the chat sessions should had video and voice.

Table 4.30: The reasons that made the participants not to attending the chat sessions

	3rd program		4th program		5th program	
	N	**%**	**N**	**%**	**N**	**%**
The time of chat session was not suitable	25	71,4	19	63,3	12	80
I am shy	2	5,7	1	3,3	1	6,7
I don't think it is beneficial	8	22,9	10	33,3	2	13,3

The reasons of the not attending the discussion lists in the third semester:

The followings are the perceptions about discussion lists and reasons that show why the 3rd, 4th and 5th programs' participants did not attend the discussion lists in the third semester of online ITCPs.

One of the 3rd, one of the 4th, and four of the 5th program's participants selected that "I am shy" and three of the 3rd, three of the 4th, and four of the 5th program's participants selected that "I don't think it is beneficial".

Two of the 4th and one of the 5th program's participants said that they didn't need to ask questions because their questions were already asked and answered by other participants. One of the 3rd, one of the 4th, and one of the 5th program's participants stated that they didn't need discussion lists, if they had problems, they solved problems themselves. One of the 5th program's participants stated that "some participants who knew the topics dominated in the discussion lists."

One of the 3rd and two of the 4th program's participants stated that our questions should be answered more quickly. Furthermore, four of the 3rd, three of the 4th and four of the 5th program's participants stated that "I don't have enough time to attend the discussion lists."

Furthermore, one participant from the 4th program and one participant from the 5th program mentioned that "The discussion couldn't be created, and the unnecessary questions were asked." Three participants from the 3rd program wrote that they couldn't attend discussion lists or they couldn't ask question in discussion lists because they followed the topic from behind.

4.4.7 The perceptions of participants about Computer Mediated Communication of Computer Networks course in online ITCPs (Research Question 4.7):

The perceptions of the 3rd, 4th and 5th programs' participants about CMC of Computer Networks course in online ITCPs were the seventh sub-question of research question 4. The questions and answers with percentages are given in Table 4.31

According to Table 4.31, the overall mean of the mean scores were 2.9 in agreement interval in the 3rd program, 2.8 in agreement interval in the 4th program and 2.6 in agreement interval in the 5th program. Item 17, which was about the attendance of the assistant to the all chat sessions, had the highest mean scores in the 3rd program (M=3.0). Item 17 and item 16, which was about the attendance of instructor to the all chat sessions, had the highest mean scores in the 4th program (M=3.0). Also, item 16 and item 18, which was about getting the satisfied answers when asking questions through e-mail, had the highest mean scores in the 5th program (M=2.8).

The lowest mean scores were related to item 19,which was about benefiting from chat sessions, in the 3rd program (M=2.8), in the 4th program (M=2.6) and in the 5th program (M=2.5). Item 20's mean score which was about getting the satisfied answers when asking questions through the discussion list were lowest mean score in the 3rd program (M=2.8), in the 4th program (M=2.7) and in the 5th program (M=2.5).

In addition, the positive perceptions of participants decreased a little from the 3rd program to 5th program about CMC of Computer Networks course.

Table 4.31: The participants' perceptions about Computer Mediated Communication of Computer Networks course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
16) The instructor attended all the chat sessions	97,3	0,0	2,7	37	2,9	95,7	4,3	0,0	47	3,0	87,5	6,3	6,3	16	2,8
17) The assistant attended all the chat sessions	97,3	2,7	0,0	37	3,0	100,0	0,0	0,0	49	3,0	68,8	25,0	6,3	16	2,6
18) I got the satisfied answers when I ask questions through e-mail	94,6	0,0	5,4	37	2,9	95,7	2,1	2,1	49	2,9	82,4	11,8	5,9	17	2,8
19) I benefited from chat sessions	86,5	5,4	8,1	37	2,8	76,6	10,6	12,8	47	2,6	66,7	16,7	16,7	12	2,5
20) I got the satisfied answers when I ask questions through discussion list	89,2	5,4	5,4	37	2,8	80,9	8,5	10,6	47	2,7	66,7	16,7	16,7	12	2,5
	Average of Mean:				2,9	Average of Mean:				2,8	Average of Mean:				2,6

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

4.4.8 The perceptions of participants about Computer Mediated Communication of Software Development Project course in online ITCPs (Research Question 4.8):

The perceptions of the 3rd, 4th and 5th programs' participants about CMC of Software Development Project course in online ITCPs were the eighth sub-question of research question 4. The questions and answers with percentages are given in Table 4.32.

According to Table 4.32, the overall mean of the mean scores were 2.8 in agreement interval in the 3rd program, 2.9 in agreement interval in the 4th program and 2.7 in agreement interval in the 5th program (out of 3). Item 17's mean score about the attendance of assistant to the all chat session were the highest mean scores in the 3rd program (M=3.0). Items 16's mean score about the attendance of instructor to the all chat session, item 17's mean score, and item 18's mean score about getting the satisfied answers when asking questions through the e-mail were the highest mean scores in the 4th program (M=3.0). Also, item 17's mean score were the highest mean scores in the 5th program (M=2.8).

The lowest mean scores were related to item 19 in the 3rd the program (M=2.8), in the 4th program (M=2.7) and in the 5th program (M=2.4). Item 20's mean score about getting the satisfied answers when asking questions through discussion list were in the 3rd program (M=2.7), in the 4th program (M=2.8), and in the 5th program (M=2.7).

In conclusion, the positive perceptions of participants increased from the 3rd program and to the 4th program, but it decreased a little in the 5th program about CMC of Software Development Project course.

Table 4.32: The participants' perceptions about Computer Mediated Communication of Software Development Project course

	3rd program					4th program					5th program				
	A (%)	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**	**A (%)**	**S.A (%)**	**D (%)**	**N**	**M**
16) The instructor attended all the chat sessions	94,6	2,7	2,7	37	2,9	100,0	0,0	0,0	47	3,0	78,6	21,4	0,0	14	2,8
17) The assistant attended all the chat sessions	100,0	0,0	0,0	37	3,0	100,0	0,0	0,0	47	3,0	92,9	7,1	0,0	14	2,9
18) I got the satisfied answers when I ask questions through e-mail	94,4	2,8	2,8	36	2,9	97,9	2,1	0,0	47	3,0	80,0	20,0	0,0	15	2,8
19) I benefited from chat session	78,4	10,8	10,8	37	2,7	80,9	8,5	10,6	47	2,7	54,5	27,3	18,2	11	2,4
20) I got the satisfied answers when I ask questions through discussion list	83,8	5,4	10,8	37	2,7	87,2	4,3	8,5	47	2,8	66,7	33,3	0,0	15	2,7
	Average of Mean:				2,8	Average of Mean:				2,9	Average of Mean:				2,7

A: Agree, **S.A:** Slightly Agree, **D:** Disagree, **N:** Number of participants, **M:** Mean

The reasons of the not attending the chat sessions in the fourth semester:

The followings are the reasons that show why the 3rd, 4th and 5th programs' participants did not attend the chat sessions in the fourth semester of online ITCPs.

As seen in Table 4.33, "The time of chat sessions was not suitable" is the one of the most influential reasons that made the participants not to attend the chat sessions for 68.6 % of the 3rd program's participants, 76 % of the 4th program's participants and 72.6 % of the 5th program's participants.

5.7 % of the 3rd, 4 % of the 4th program's participants said one of the reasons that they were shy. 25.7 % of the 3rd program's participants, 20 % of the 4th program's participants and 27.3 % of the 5th program's participants stated that they didn't think it may be beneficial.

In addition, two of the 3rd, three of the 4th, and one of the 5th program's participants stated that they could not attend chat sessions because of their personal problems, for example, they didn't have much time or their company didn't permit to them. One of the 4th program's participants said that chat sessions should be more often. Two of the 3rd program's participants stated that the time of chat sessions should be changed. One of the 3rd program's participants wrote that "I don't know how to do chat". One of the 5th program's participants stated that the participants, who had much knowledge about the topics, wanted to dominate during the chat sessions. One of the 3rd program's participants said that the attending chat sessions shouldn't be in evaluation criteria.

Table 4.33: The reasons that made the participants not to attending the chat sessions

	3rd program		4th program		5th program	
	N	**%**	**N**	**%**	**N**	**%**
The time of chat session was not suitable	24	68,6	19	76	8	72,7
I am shy	2	5,7	1	4	0	0
I don't think it is beneficial	9	25,7	5	20	3	27,3

The reasons of the not attending the discussion lists in the fourth semester:

The followings are the perceptions about discussion list and reasons that show why the 3rd, 4th and 5th programs' participants did not attend the discussion lists in the fourth semester of online ITCPs.

Two of the 3rd, two of the 4th and one of the 5th program's participants selected that "I am shy" and two of the 3rd program's participants, four of the 4th program's participants and four of the 5th program's participants selected that "I don't think it is beneficial"

One of the 3rd and one of the 4th program's participants said that they didn't need to ask question because their questions were already asked and answered by other participants. One of the 3rd program's participants stated that they didn't need discussion lists, if they had problems, they solved problems themselves.

One of the 4th program's participants stated that our questions should be answered more quickly. Furthermore, three of the 3rd program's participants, three of the 4th program's participants and two of the 5th program's participants stated that "I don't have enough time to attend the discussion lists."

Two participants from 3rd program and one participant from 5th program wrote that they couldn't attend the discussion lists or they couldn't ask question in discussion lists because they followed the topic from behind.

4.5 Summary of the Findings

Based on the data analysis and results, which were presented, the following findings could be summarized.

The participants' preferences about online ITCPs (Research Question 1)

The preferences of 3rd, 4th and 5th programs' participants about online ITCPs were the first main question.

According to findings, "Education is offered by Middle East Technical University" was one of the most influential factors in choosing online ITCPs for most of the participants. "To be more productive in my present job" was one of the leading expectations about online ITCPs for participants. In addition, most of the 3rd and 4th programs' participants thought that the cost of certificate program was high while most of the 5th programs' participants thought that the cost of certificate program was normal.

The participants' perceptions about the effectiveness of courses in online ITCPs (Research Question 2)

The perceptions of 3rd, 4th and 5th programs' participants about the effectiveness of courses in online ITCPs were the second main question.

According to statistical results, the perceptions of participants about effectiveness of courses were above the average. Furthermore, the positive perceptions of participants about the effectiveness of Computer Systems and Structures, Operating Systems with UNIX, and Software Development Project courses increased little from the 3rd program to 4th program, but decreased a little again in the 5th program. Also, the positive perceptions of participants about the effectiveness of Software Engineering, and Database Management Systems courses decreased from 3rd program to 5th program, and the effectiveness of Data Structures and Algorithms with C course decreased from the 4th program to 5th program. In addition, the positive perceptions of participants about the

effectiveness of Introduction to Computer Programming with C were the same in the 4th and the 5th program.

Moreover, in the open-ended part of questionnaire, the 3rd, 4th and 5th programs' participants stated that

- The proper courses were selected and the contents of courses were well prepared.
- The way of giving courses were satisfying.
- The program reached its aim.
- The program provided the basic information to help them improve themselves.
- They were satisfied with the courses.
- One of the lowest mean scores in the course notes was related to item 4, which was about often finding mistakes in the course notes and some of the participants mentioned that the language used in the course notes was incomprehensible; there were some spelling and grammar errors in the notes.

On the other hand, some of the participants indicated that

- The course notes should comprise more examples, exercises and detailed information and it should include more applications and practical examples since some of the course topics are too theoretical.
- The courses should be supported with more visual and should have more animations and applets.
- The topics of the courses were too compact, the semesters in the program were too short and the flow of courses was very fast.
- More resources should be given for course topics, such as, references, links and books
- The course notes were disorganized, and the topics of course notes were not distributed equally in each week.
- The course should be more understandable and instructive. It should be more interesting and some courses were harder.

- The homeworks' result should be more detailed, more feedback should be given and the homeworks' answers and results should be declared in a short time.
- Some homeworks were very difficult and the number of homeworks were not enough. It was not instructive and there was no standard in the homeworks. Some of them were too difficult or too easy.
- The participants should be informed about the exams beforehand. The exams questions and answers should be exposed to the participants after exams.

The participants' perceptions about learner supports in online ITCPs (Research Question 3)

The third main question of this study was related with the perceptions of the 3rd, 4th and 5th programs' participants about learner support in online ITCPs.

According to statistical results, the perceptions of majority of the participants about the learner support were positive. Furthermore, the perceptions of the participants about learner support of Computer Systems and Structures, Introduction to Computer Programming with C, Data Structure and Algorithms, Computer Networks were quite positive. The positive perceptions of participants about learner support increased from the 3rd program to the 4th program, but it decreased a little in the 5th program in Operating Systems with Unix course. The perceptions of participants were quite positive in the 3rd and 4th programs, but it decreased a little in the 5th program about learner support of Software Engineering, Database Management Systems, and Software Development Project courses.

Moreover, in the open-ended questions, the participants stated that the number of face to face lecture on campus should be more.

The participants' perceptions about Computer Mediated Communication (CMC) in online ITCPs (Research Question 4)

The perceptions of the 3rd, 4th and 5th programs' participants about Computer Mediated Communication in online ITCPs were the fourth main question.

According to statistical results, the perceptions of the participants about (CMC) were positive. Furthermore, the perceptions of participants about CMC of Computer Systems and Structures and Introduction to Computer Programming with C were quite positive. The positive perceptions of participants increased from the 3rd program to the 4th program, but it decreased a little in the 5th program about CMC of Operating Systems with Unix and Software Development Project courses. The perceptions of participants were quite positive in the 3rd and 4th programs, but it decreased a little in the 5th program about CMC of Software Engineering, and Database Management Systems courses. In addition, the positive perceptions of participants decreased a little from the 3rd program to 4th program about CMC of Data Structure and Algorithms course and from the 3rd program to 5th program about CMC of Computer Networks course. Moreover, the instructors and assistants attended all the chat sessions in general and participants got the satisfied answers when they asked questions through discussion lists or e-mail.

In addition, "The time of chat session was not suitable" was one of the most influential reasons that made the participants not to attend the chat sessions. From the open-ended questions, the participants stated that

- They couldn't attend the chat sessions because of their personal problems, for example, they didn't have much time, they didn't have a computer, Internet connection at home, or technical problem.
- They followed to the chat log files instead of attending the chat sessions.

Moreover, the participants' views about chat sessions were that

- The chat sessions were not effective, because the participants who attended the chat sessions had different knowledge levels, the participants who had much knowledge about the topic wanted to dominate during the chat sessions.
- The chat sessions were not suitable environment for learning; they couldn't follow the sessions because of having to write and answer at the same time.
- The participants who attended the chat sessions discussed daily topics instead of course topics and they didn't think it may be beneficial.

In addition, participants' suggestions about chat session were that

- The chat sessions should be divided in to the small groups according to participant's knowledge level, and should be more often.
- The attending chat sessions shouldn't be in the evaluation criteria

In addition, "I don't think it is beneficial" was one of the most influential reasons that made the participants not to attend the discussion lists. From the open-ended questions, the participants stated that

- They didn't need to ask questions because their questions were already asked and answered by other participants.
- They didn't need discussion lists, if they had problems, they solved problems themselves.
- They did not have much information to discuss the topics.
- They couldn't explain their problems or questions with writing because it took much time.
- They couldn't attend the discussion lists or they couldn't ask questions in discussion lists because they were behind the group in following the topic discussed.
- They were shy to attend the discussion lists.
- They did not have enough time to attend the discussion lists.

- The participants who attended the discussion list had different knowledge levels and they wanted to dominate in the discussion lists.

In addition, participants' suggestions about discussion lists were that

- Their questions should be answered more quickly.
- The structure of discussion lists should be more useful.

CHAPTER 5

CONCLUSIONS AND IMPLICATIONS

The findings of the study were presented in detail in the previous chapter under the title of results. In the light of the findings, a discussion of conclusions, implications and recommendations were presented in this chapter.

5.1 Conclusions

The purpose of the study was to investigate the perceptions of the 3rd, 4th and 5th online Information Technologies Certificate programs' participants about the programs in regard to their preferences, course effectiveness, learner support and computer mediated communication.

The major findings of the study were discussed under the related research questions.

5.1.1 The preferences of participants about online ITCPs

There are a number of research studies showing what motivates adults to be involved in continuous formal education. For instance, Houle (1971) conducted a qualitative study from which he identified three types of adult learners. One of them was goal-oriented who pursued education in order to accomplish a definite objective. Another one was learning-oriented who pursued knowledge for its own sake. The last one was activity-oriented who pursued learning with no necessary connection to the stated purpose of the activity. (cited in McCreary,

1990). In addition, the results in this study obtained by online survey showed that the participants expected to be productive in their present jobs and to make progress in their existing careers as a result of online ITCPs, some of them also anticipated that they would find a job and change their work area. Therefore, it can be concluded that the partcipants of this study were mainly learning and goal oriented participants. In other words, it can be said that the factors that affected the participants in choosing online ITCPs and the participants' expectations about online ITCPs were parallel to the aim of the online ITCPs.

Although the results of the study indicated the most influential factors in choosing online ITCPs as "the program offered by METU", other important factors were stated by participants were "improvement in their careers, program was offered through the Internet and program was related to their interests". As Matthews (1999) stated, the flexibility of the online program in terms of time, place, scheduling of personal time, and accessing higher education to improve themselves (particularly for the nontraditional students) were some factors that influence the students in attending online programs.

Moreover, the results revealed that most of the 3rd, 4th programs' participants agreed that the cost of the certificate program was high, however, many of the participants in recent programs became less concerned with the cost of the program. For example, half of the 5th program's participants thought the cost of certificate program was normal. The main reason may be that the payment of the programs could be made in Turkish Liras rather than in US Dollars after the 4th program started.

5.1.2 The perceptions of participants about the effectiveness of the courses in online ITCPs

In the literature, students' perspectives of web based instruction are varied but generally positive. Many students reported that the convenience of this medium meets the needs of the nontraditional students who also have work and family responsibilities. Access to a large amount of information and the interactivity of

the Internet are two consistent assets of WBI cited by many students (Daugherty, Funke, 1998). In this study, the results revealed that the participants' perceptions about the effectiveness of the courses in online ITCPs were positive in general. However, many suggestions have been made to improve the program. Firstly, the strengths and weakness of the courses are presented, and then participants' suggestions are analyzed.

Strengths of the courses:

From the results obtained in the previous chapter, some of the highest mean scores in the questionnaire about the effectiveness of the courses were related to items 13, 5, 10, 11, 9, 12, 1, 8, and 7 (see appendix B).

One of the strengths of the courses as indicated by participants was that the course topics increased their interest in the subject area and also, these results were parallel to those found in the open-ended part of the questionnaire. They indicated that the proper courses were selected and the contents of courses were well prepared.

In addition, the other strengths of the courses were related to the usefulness of the textbooks suggested and resources. The textbooks suggested and resources provided were found to be appropriate for the courses. The participants also indicated that the homeworks given, examples and exercises provided in the notes were helpful for learning and understanding the subject. Furthermore, the participants' perceptions were positive about the fluency and clearness of the course notes and sufficiency of the multimedia applications even though some of the participants stated that there were not enough visuals and animations.

The results showed that exams properly measured the participants' knowledge level, and assessed whether they learned the subject properly or not. These results were similar to those found in the open-ended part of the questionnaire. They stated that the way of giving courses were satisfying and they were satisfied with the courses.

ITCP is still one of the certificate programs given over the Internet in Turkey. Some of the participants claimed that this program reached its aim. In addition, they pointed out that they had received the basic information, so they would improve themselves from now on.

Weaknesses of the courses:

The results of the study showed that some of the lowest mean scores in the questionnaire about the effectiveness of the courses were related to items 3, 4, 2, and 6 (see appendix B).

Even though some of the participants were positive about the course notes in terms of examples, exercises provided and clearness, the weaknesses of the courses as indicated by participants were that they often found mistakes in the course notes. These findings were parallel to those found in the open-ended part of the questionnaire. They stated that the language used in the course notes was incomprehensible; there were some spelling and grammar errors in the notes. Also, they wrote that they had some difficulties in understanding some concepts in the course notes because they sometimes needed terms to be provided in English. One of the main reasons was probably that the course notes were prepared with help of translated from English to Turkish documents. However, these weaknesses of the courses were very crucial for the program to reach its aim. Fox's statement was inline with these findings, Fox (2000) stated that online programs were unsuccessful when they failed to build in interaction, when the materials or instructions were not clear, when communities were not established, and when students and teachers did not have the necessary training to be successful.

All of the participants had different demographic characteristics and had graduated or studied in different fields, but mainly in engineering. However, most of these engineers had not graduated from computer engineering departments. Similar to the finding of McGrath (1998), that is, preparing online course was affected by students' characteristics like their grade levels, socioeconomic conditions, expertise, and learning styles. Although the courses

given in these programs were fundamentals of the computer engineering fields, most of the participants agreed that the content of the courses were difficult. It can be concluded from these findings that the difficulty level of the courses not in accordance with the learners.

Furthermore, the other lowest mean scores of questionnaire were related to the sufficiency of the examples, and also satisfaction from course notes. Some of the participants indicated that the contents of course notes should comprise more examples, exercises and detailed information. It should consist of more applications and practical examples since some course topics consisted of too much theoretical knowledge. This finding verifies Collins (1988), who said that the process of learning disclosed through the application of knowledge and skills to the solution of real world problems, often in the contexts of real practice, should be used in good educational design. It can be stated that although the exercises, examples and homeworks provided were found to be useful, the number of them were not enough as stated by the participants.

Suggestions toward the improvement of courses:

Although the results of open-ended questions analyzed were in parallel with the results of the questionnaire, many suggestions were made to help to improve the courses. For example, some of the participants pointed out that course notes, especially in the first terms of the programs, consisted of basic information, and the notes should have consisted of more extended and detailed information. In addition, there were examples and exercises in the course notes, and some of the participants thought that they were useful to understand the content of the courses, but others stated that the contents of the course notes should be comprised of more examples, exercises and detailed information.

In addition, some of the participants indicated that the courses should be more visual and they should have more animations and applets. They preferred the course notes to be more interactive. The results of this study were inline with the Yıldırım's study (2002). This study analyzed student perceptions about Web-enhanced instruction in an Introductory Chemistry course given in two semesters

in METU. The results showed that most of the students wanted the existing materials to be improved and interactive materials for all the concepts to be developed.

Some of the participants stated that the topics of courses were too compact, the semesters in the program were too short and the flow of courses was very fast, and it should consist of more applications and practical examples since some course topics consisted of too much theoretical knowledge. Furthermore, it should be given more resources for course topics, such as, references, links and books especially in Turkish. It can be concluded that most of the participants of the ITCPs have work and family responsibilities. For these reasons, they may need more time than the full time students to master the content. Similar findings were seen in the study by Dutton, Dutton, and Perry (2002), in which, online students were older. They were more likely to have job and/or childcare responsibilities and longer average commutes to campus. They were less likely to be enrolled in traditional undergraduate programs and more likely to be lifelong learning students. Online students rate class conflicted with work, reducing commuting time, and flexibility in studying as being more important to them in their choice of course format than did lecture students.

In addition, Ypsilandis (2002) stated that organizing input material and feedback in distance learning was very important and was perhaps the crucial factor for success or failure of a distance-learning course as these courses usually had a high drop-out rate. The results of this study supported this idea. For example, some of the participants thought that the feedbacks provided for homeworks should be more detailed, and the homeworks' answers and results should be declared in a short time. Furthermore, the participants stated that they should be informed about the exam earlier and exams questions and answers should be given to the participants after the exams. Distance educators supported these findings in Thach and Murphy's study (1995), surveying 103 distance educators, the researchers found that behaviors such as praising students, calling students by name, and providing individual feedback were thought by these educators to be important factors in educational delivery.

5.1.3 The perceptions of participants about learner support in online ITCPs

The learner support system is one of the most critical aspects of distance education. Undoubtedly the most important element of any learner support system is the distance teacher who has the ability to promote understanding and guide students to achieve their educational goals. In this study, the results showed that perceptions of participants about learner support in online ITCPs were highly positive.

The program participants thought that instructors and assistants helped them when they were confused or had problems. These were important for online learning, because Faigley (1990) stated that student learning outcomes and satisfaction in online educational environments were related to changes in the traditional instructor's role from leader to that of facilitator and moderator.

In addition, these online programs were based on synchronous and asynchronous communication over the Internet and face to face courses at METU's campus. The trend is very much towards combining synchronous and asynchronous media in an attempt to take advantages of both modes. According to McIsaac and Gunawardena (1996), distance education technology moving toward multi-media systems, integrates a combination of technologies both synchronous and asynchronous. Chat session and face to face courses prevented alienation of the learners from the teachers. Findings of open-ended questions in this study were parallel to the McIsaac and Gunawardena's statement. Some of the participants stated that the number of face to face lectures at the campus should be more. For example, after one month, they wanted one more face to face course.

Furthermore, teaching online is a new experience for many instructors, and it is different from teaching in a conventional classroom. It requires a different set of skills and a different pedagogy. According to Palloff and Pratt (1999), the shift to online learning poses enormous challenges to instructors and their institutions. Many faculty and administrators believe that the cyberspace classroom is no different from the face to face classroom and that approaches used face-to-face

will surely work online. In this study, some of the participants wanted the instructors to exert more effort in some courses.

In addition, the number of participants in this online learning program is more than that of traditional learning for one instructor. Online learners need more interest and support to prevent them from isolation because of the lack of face to face instruction. The number of participants for chat sessions might be a lot for one instructor. Therefore, there should be enough number of instructors and assistants to supply effective learner support in online learning.

5.1.4 The perceptions of participants about CMC in online ITCPs

Facilities of the web based education are bringing collaborative learning to the forefront. With the help of chat sessions, discussion lists and e-mail, collaborative learning environments can be created in online courses.

Berge (1995) said that one of the facilitator's roles in online learning is striving for participation by all students, according to Miller and Miller (1999), another role of the facilitators is providing an opportunity for students to give feedback regarding learning and course progress. The results of this study showed that the instructors and assistants attended all the chat sessions in general, and participants were satisfied with the answers provided for their questions through e-mail or discussion lists in this study.

Although some of the participants thought that they benefited from communication tools, such as chat sessions and discussion lists, there exist some suggestions and problems about the CMC stated by participants. The followings were mentioned about these suggestions and problems.

<u>The reasons for not attending the chat sessions and discussion lists</u>

Participations in the chat sessions and discussion list were less then expected in these programs. There were many reasons for not attending the chat sessions and discussion lists. One of the main problems was that the time of chat sessions was

not suitable for many of the participants. In addition, many of the participants could not attend chat sessions and discussion lists because of their personal problems. They stated that they did not have much time, they did not have a computer or Internet at home, or their company did not give permission to attend chat sessions. According to Hara, Bonk, and Angeli (2000), barriers to collaborative learning included differences in team member contributions and variability in access to computer equipment. As adult learners, each of the students balanced outside work, family, and schedules that impacted their timing and frequency of participation. In these programs, pre-determined times of the chat sessions restricted the participants.

In addition, some of the participants stated that the chat sessions and discussion lists sometimes were not effective, because the participants who attended the chat sessions had different level of knowledge, and the participants who had much knowledge about the topic wanted to dominate during the chat sessions or at the discussion lists. To solve these problems, some tasks and duties might be given to the participants who want to dominate during the chat sessions and at the discussion lists and there should be facilities provided by instructors to create group works among participants before coming to the chat sessions. Also, the friendly environment should be created by instructors during the chat sessions and at the discussion lists.

Also, the participants who attended the chat sessions and discussion lists discussed daily topics instead of course topics. These findings were consistent with research indicating that students seldom connected their online comments to specific course concepts because they did not realize they were expected to, and they tended to speak anecdotally. Comments were often unrelated to course readings, theories or research topics discussed in class (Murray, 2000). Therefore, the topics which will be discussed should be structured by instructors at the beginning of the sessions. All participants should with their homeworks and responsibilities about courses before starting the sessions and asking their questions at the discussion lists.

It was known that there were some barriers in computer mediated communication. For example, Murphy, Drabier, and Epps (1998) stated that the barriers to computer conferencing were dramatic. Students experienced an initial constraint as a result of having to type all comments, a process that "requires an adjustment to a new form of communication (i.e., using keyboard to communicate with short statements, learning to pause for feedback, etc.)". Also, some participants in this study pointed out that the chat sessions were not suitable environments for learning; they could not follow the sessions because of having to write and answer at the same time.

Furthermore, some of the participants indicated that they did not need to ask questions because their questions had already been asked and answered by other participants. In addition, some of them stated that they couldn't attend the discussion lists or they could not ask questions in discussion lists because they were behind in the subjects or they did not have much information to discuss the topics. These findings were consistent with research indicating that the some of the CMC users often fail to recognize was that "active listeners" or "lurkers" might read but not respond to the conferencing messages (Shapard, 1990, cited in Hara, Bonk, Angeli, 2000). It can be concluded that many of the participants used communication tools when they needed.

Suggestions of the participants should also be considered when conducting the online program such that the chat sessions should be divided into the small groups according to participant's level of knowledge and also they stated conducted more frequently.

5.1.5 The differences of the participants' perception in online 3rd, 4th and 5th ITCPs

Although the participants' perceptions showed similarities in many items, there were some differences. In regard to the first term of the programs, participants' perceptions about course effectiveness did not change much in the 3rd, 4th and 5th online ITCPs. However, in the other terms, there was not consistency from one

program to the other ones in regard to participant's perceptions of the course effectiveness. For example, positive perceptions decreased in some courses, which are, Data Structure and Algorithms, Software Engineering, Database Management Systems and Computer Networks from the 3rd to 5th programs. In addition, positive perceptions in some courses such as, Operating Systems with Unix and Software Development Project increased slightly from 3rd to 4th program, but again decreased from 4th to 5th programs.

Even though the participants' perceptions about learner support and computer mediated communication were generally positive in the 3rd, 4th and 5th programs, there was a decrease in positive perceptions of the participants about learner support. It was seen that positive perceptions gradually decreased from the 3rd program to 5th programs. The possible reason might be that the course notes were not updated enough in the following years.

5.2 Suggestions

Online Information Technologies Certificate Program is one of the first Internet-based education programs in Turkey. This program was started in 1998 and it is still offering certificate to the participants. It has been updating course materials, web pages, and changing courses, instructors, and its curriculum in these 5 years. With this study, the results contributed to better understanding of the preferences of the 3rd, 4th and 5th programs' participants about online ITCPs, and perceptions of the 3rd, 4th and 5th programs' participants about course effectiveness, learner support and CMC in online ITCPs. Consequently, the results of this study are valuable for the improvement of online ITCP.

The participants' demographic characteristics showed that the groups were very heterogonous. Participants showed differences in terms of especially age, education levels, and faculties graduated from or currently studied at. Although the general perceptions of the participants were positive, in the open-ended questions, there were various participants' desires and expectations about course materials, chat sessions, discussion list, homeworks, exams, and instructors. To

sum up, it can be suggested that online courses or programs should be designed by taking into consideration of the all participants' desires and expectations.

The data from this study indicated that the course subjects, textbooks and other resources, and sufficiency of the exercises, examples, homeworks, multimedia applications in the course notes affected participants' perceptions about the effectiveness of the courses. Knowing what factors influence a student's perceptions in an online course can help course designers while preparing online courses or updating the courses. In addition, participants expected that the course notes should comprise more examples, exercises and detailed information and it should include more applications and practical examples since some of the course topics were too theoretical. This program was a certificate program, so courses subjects and applications should include more real life experiences and interesting homeworks and examples might be prepared by instructors.

The findings in the open-ended questions indicated that semesters in the program lasted eight weeks caused some problems. Participants stated that topics of courses were too compact, the semesters in the program were too short, the flow of courses was very fast and the topics of course notes were disorganized because the topics of course notes were not distributed equally in each week. Therefore, a thoughtful instructional design was even more critical in distance education courses or programs to provide flexibility of the time. Students needed to see an order and progress in their learning. For an online student, such order must be clearer. More importantly, the instructional design showed the motivations and philosophy of the instructor (Bernad, 1997). Also, at the beginning of the program, orientation web pages should be more detailed on how to study in the online program or if it can be possible, orientation programs should be prepared face to face on campus.

In this program, course materials were prepared in Turkish by the instructors. Although course materials have been revised, there were still some mistakes in the course notes. While preparing course notes, some topics were translated from

English to Turkish. Therefore, the course materials should be examined and updated.

Although the results were positive about learner support, giving immediate feedback was the critical issue. Participants stated that the homeworks' feedback should be more detailed, more feedback should be given for each participant to see their errors or corrects, the homeworks' answers and results should be declared in a short time, and their questions in the discussion list should be answered more quickly. To eliminate this kind of problems, more assistants should be employed in the program.

Participants to participants and participants to instructors interaction were important in distance learning as mentioned in detail in literature review chapter. However, attending chat sessions and discussion lists were less then expected. To increase the interaction, participants should be encouraged participation in discussion lists and chat sessions. In addition, the chat sessions should be designed according to the participants' desire, such as in a suitable time and participants' levels of knowledge. Furthermore, instructor roles should be defined, if necessary a short training can be provided on "online instructors" and he/she should guide the discussion.

In the literature, there are many research studies done on only one delivery method in distance learning, and emphasize on student outcomes for individual courses rather than for total academic programs. The results of this study will provide valuable information to the literature about both asynchronous and synchronous delivery methods. In addition, this study is prepared to examine the total of online certificate program. Therefore, the results of this study will contribute to literature in this field as the investigation of the whole program.

In addition, the results of the study would clarify participants' perceptions about course effectiveness, learner support and computers mediated communication in the online ITCPs, and consequently these results would help for the improving these kinds of programs and studying related field in Turkey.

5.3 Recommendations for the further studies

There has been no research conducted on these programs so far. Therefore, there is an ongoing need for further research to make the online ITCPs more effective. In this study, the perceptions of the participants were gathered and analyzed. It would also be interesting to complement this study with the instructors' and administrative' perspectives about online ITCPs. Furthermore, it should be studied about relationship between factors such as learner support and CMC in online ITCPs and the achievement of the participants. Also, participant's logs should be examined, such as chat sessions' logs, discussion lists' logs.

Multiple research methods may be used: using both qualitative and quantitative methods within the same research study to analyze deeply the perceptions of the participants about courses, learner support and CMC in online ITCPs. Furthermore, a more frequent data collection schedule may be used to collect more specific feedback about materials and implementations.

Further research is also needed to find out the effect of participants' demographics on their attitude toward the program and achievement scores.

Another research topic can be testing the usability of the program web sites and interface. The perceptions of the participants about usability of the program interface should be analyzed, and according to these results, some parts of web sites would be designed again.

In addition, the most important research topics about these kinds of certificate programs are related to the graduates of the programs. It would be searched that the participants would use this certificate in their real life.

Furthermore, the results of this study about online ITCPs would be compared with similar online programs or traditional programs in regard to course effectiveness, learner support and computer mediated communication.

REFERENCES

Agaoglu, E., Imer, G., Kurubacak, G., (2002). A Case Study of Organizing Distance Education: Anadolu University. TOJDE January 2002 ISSN 1302-6488 Volume: 3 Number: 1.

Bennett, G. (2001). Student learning in the online environment: No significant difference?. Quest, 53(1), 13.

Berge, Z.L. (1995). Facilitating Computer Conferencing: Recommendations From the Field. Educational Technology,35(1) 22-30, URL:http://www.emoderators.com/moderators/teach_online.html

Berge, Z.L. (1998). Barriers to online teaching in post-secondary institutions: Can policy changes fix it?. Online Journal of Distance Learning Administration 1(2), URL:http://www.westga.edu/~distance/Berge12.html

Bernard, John, (1997). The World Wide Web and Higher Education: The Promise of Virtual Universities and Online Libraries. Educational Technology, 37 (3), 30-35.

Brush, T. A., Uden, L. (2000). Using Computer-Mediated Communications to Enhance Instructional Design Classes: A Case Study. International Journal of Instructional Media, 00921815, 2000, Vol. 27, Issue 2.

Chandrasekhar, R. (2000). III. Management of the Human Resources Development for Information Technology, Consultant to the International Trade and Industry Division, ESCAP

Chen, H. (1998). Synchronous versus Asynchronous Interaction. URL:http://seamonkey.ed.asu.edu/~mcisaac/disted/final98/finalhc.html

Chickering, A.W., Ehrmann, S.C. (1996). Implementing the Seven Principles: Technology as Lever. American Association for Higher Education Bulletin, 3-6. October, 1996. URL: http://www.tltgroup.org/programs/seven.html.

Chin, K. L. (1999).A study into students' perceptions of web-based learning environment. HERDSA Annual International Conference, Melbourne, 12-15 July 1999

Clay, M. (1999). Development of Training and Support Programs for Distance Education Instructors, Online Journal of Distance Learning Administration, Volume II, Number III, Fall1999

Christie, M., Jaun A., Jonsson, L. (2002). Evaluating the use of ICT in engineering education, EUR. J. ENG. ED., 2002, VOL. 27, NO. 1, 13–20

Collins, M. P., Berge Z. L. (1994). Guiding Design Principles for Interactive Teleconferencing. Paper presented at the Pathways to Change: New Directions for Distance Education and Training Conference, September 29, 30, and October 1,1994.
URL:http://www.emoderators.com/papers/augusta.html

Daugherty, M., Funke B. L.(1998). University Faculty and Student Perceptions of Web-Based Instruction, Journal of Distance Education ISSN: 0830-0445 Innovations in Distance Education.
URL:http:www.cde.psu.edu/de/ide/policy/default.html

Delaney, E. J., Kummer, G. (1995). What Have We Learned From Our Electronic Mail Experiences in the Classroom? 1995 Paper originally presented at 1995 AAG Meetings Annual Meetings of the Association of American Geographers (AAG) in Chicago.
URL:http://faculty.washington.edu/~krumme/projects/jghevers.html

Dillon, Connie L., Gunawardena, Charlotte N.(1992). Learner support in distance education: An evaluation of a state-wide telecommunications system. International Journal of Instructional Media, 1992, Vol. 19 Issue 4, p297, 16p, 6 charts

Dringus, Laurie P. (1999). Connecting Resources in Online Learning Environments. Online Journal of Distance Learning Administration, Volume II, Number II, Summmer1999.

Dziuban, C., Moskal, P. (2001). Evaluating distributed learning in metropolitan universities. Metropolitan Universities, 12(1). Indianapolis: Indiana University-Purdue University Indianapolis (IUPUI).

Dutton, J., Dutton, M., Perry, J. (2002). How do online students differ from lecture students?. Journal of Asynchronous Learning Networks (JALN), 6(1), 1-20.
URL:http://www.aln.org/alnweb/journal/Vol6_issue1/6_1dutton.htm

Ehrmann, S.C. (1995). Asking the Right Question: What does Research tell us about technology and higher learning? Change,17, (2) 20-27, March/April, 1995.
URL:http://www.learner.org/edtech/rscheval/rightquestion.html

Faigley, L.(1990). Subverting the Electronic Workbook: Teaching Writing Using Networked Computers. The Writing Teacher as Researcher: Essays in the Theory and Practice of Class-Based Research. Portsmouth, NH:Henemann.
URL: http://www.cwrl.utexas.edu/~faigley/work/pub.html

Fleischman, John. (1998). Distance learning and adult basic education.In C. Hopey (Ed.) Technology, Basic Skills, and Adult Education: Getting Ready to Move Forward. The Center on Education and Training for Employment, College of Education, The Ohio State University.
URL:http://wwwtcall.tamu.edu/hopey/09.pdf

Fox, J. I. (2000). Review of the Factors Influencing the Satisfaction of Learning in Online Courses at Marshall University Dissertation, West Virginia University,
URL: http://etd.wvu.edu/templates/showETD.cfm?recnum=1345

Fredericksen, E., Pickett, A., Shea, P. Pelz, W. & Swan, K. (2000). Student satisfaction and perceived learning with on-line courses: Principles and examples from the SUNY learning network. Journal of Asynchronous Learning Networks, 4(2).
URL: http://www.aln.org/alnweb/journal/Vol4_issue2/le/Fredericksen/

Garson G. D. (1999). The Role of Technology in Quality Education. Thought & Action, Vol. 15, No. 2 (Fall, 1999): 105-118.
URL:http://hcl.chass.ncsu.edu/sscore/garson2.htm

Gibson, T., Gibson, C. (1996). QDE: Lessons Learned. Distance Education Clearinghouse. URL: http://bluto.uwex.edu:80/disted/qde/factors.html

Graham, C., Cagiltay, K., Lim, B., Craner, J., and Duffy, T. M. (2001). Seven Principles of Effective Teaching: A Practical Lens for Evaluating Online Courses. Technology Source.
URL: http://horizon.unc.edu/TS/default.asp?show=article&id=839

Hackman, M.Z., Walker, K.B. (1990). Instructional communication in the televised classroom: The effects of system design and teacher immediacy on student learning and satisfaction. Communication Education Communication Education, 39, 196-206.

Hanna, D. E. (1998). Higher education in an era of digital competition: Emerging organizational models. Journal of Asynchronous Learning Networks, 2(1).
URL:http://www.aln.org/alnweb/journal/jaln_vol2issue1.htm#hanna

Hara, N., Bonk, C.J., Angeli, C. (2000). Content analyses of online discussion in an applied educational psychology course. Instructional Science, 28(2), 115-152.

Hill, J. R.(2000),Online Learning Communities: If You Build Them, Will They Stay, ITFORUM ,October 10, 2000.
URL:http://it.coe.uga.edu/itforum/paper46/paper46.htm

Hofmann, D. W. (2002). Internet-Based Distance Learning in Higher Education. Tech Directions. 62(1), 28(5).

Hubbard, G. U., Mortensen, M. (1997). Distance Education II: Research, Law, Practice and Opportunity. Denton, TX: Texas Center for Educational Technology, chapters 1, 7, appendix III.
URL: http://www.tcet.unt.edu/de2.htm

Hugh, M.A., Forest, S. (1997). Distance education in early intervention programs: Linking preservice and inservice. In P.J. Winton, J.A., McCollum, and C. Catlett (Eds.), Reforming personnel preparation in early intervention: Issues, models, and practical strategies (pp. 475-494). Baltimore, MD: Paul H Brookes Publishing Company. (361.70973 WIN – Book)

IDC Reports (1999). Daily Marketing Analysis. Retrieved from URL:http://www.idcturkey.com/

IDE_AS (1999). Internet based education_asynchronous and synchronous program. Retrieved from URL:http://bote.fedu.metu.edu.tr/ideas/ideas.htm

ITT Technical Institute (2003). Facts about Information Technology in Business and Industry. Retrieved from URL:http://www.itt-tech.edu/teach/it.html

IITE Analytical Survey (2000). Distance Education for the Information Society: policies, pedagogy and professional development, IITE UNESCO. URL:http://kenyaseminar.iite.ru/docs/Analyt_Survey.pdf

Irani, T. (1998). Communication potential, information richness and attitude: A study of computer mediated communication in the ALN classroom. ALN Magazine, 2 (1), 1-12 pages, December, 1998. URL: http://www.aln.org/publications/magazine/v2n1/irani.asp

Johnson, M. M., Huff, M. T. (2000). Students' Use of Computer-Mediated Communication in a Distance Education Course. Research on Social Work Practice,10497315, Jul2000, Vol. 10, Issue 4

Jung, I.S. (2000). An annotated bibliography on Internet-based learning environment. Online monograph. American Center for the Study of Distance Education, Penn State University, USA. URL: http://www.ed.psu.edu/acsde

Kamin C., Glicken A., Hall M., Quarantillo B., Hay J.,(2001) Evaluation of electronic discussion groups as a teaching/learning strategy in an evidence-based medicine course. Educ Health Change Train Pract. 2001;14(1):21-32.

Keegan, D. (1990). The Foundations of Distance Education (2nd ed.).

Klemm,W.R.,Lemm,W.R, (1998). Eight Ways to Get Students More Engaged in Online Conferences. The Higher Education Journal. 26 (1): 62-64. URL:http://www.thejournal.com

Knowles, M. (1984). The Adult Learner: A Neglected Species (3rd Ed.). Houston, TX: Gulf Publishing

LaMonica, L. (2000). The role of the instructor in Web-based instruction: Are we practicing what we preach?. DEOSNEWS, 11(6) Retrieved January 12, 2002, URL:http://www.ed.psu.edu/acsde/deos/deosnews/deosarchives.asp

Larison, R. D.(1997). The Lecture Really Is Dead: Using Electronic Media to Teach On-Campus Courses. Educational Resources Information Center, 2-8. U.S. Department of Education, Office of Educational Research and Improvement, ERIC No: ED430525,1997. URL:http://www.mtsu.edu/~itconf/proceed97/dead.html

Matthews, D. (1999). The Origins of Distance Education and Its Use in the United States. T.H.E. Journal. URL:http://www.thejournal.com/magazine/vault/A2222.cfm

McCreary, E. K. (1990). Three behavioral models for computer-mediated communication. Online Education: Perspectives on a New Environment (pp. 117-130). New York, NY: Praeger.

McDonald, J. (2002). Is "As Good As Face-to-face" As Good As it Gets. Journal of Asynchronous Learning Networks. 6 (2).URL: http://www.aln.org/alnweb/journal/Vol6issue2_nursing/6_2MacDonald.pdf

McGrath, B. (1998). Partners in learning: twelve ways technology changes the teacher-student relationship. T.H.E. Journal, 58-61. URL:http://www.thejournal.com/magazine/vault/a1982.cfm

McIsaac, M.S., Gunawardena, C.N. (1996). Distance Education. In D.H. Jonassen, ed. Handbook of research for educational communications and technology: a project of the Association for Educational Communications and Technology. 403-437. New York: Simon& Schuster Macmillan. URL:http://seamonkey.ed.asu.edu/~mcisaac/dechapter/

McLoughlin C. (2002). Learner Support in Distance and Networked Learning Environments: Ten Dimensions for Successful Design. Distance Education, Oct2002, Vol. 23 Issue 2, p149, 14p

Meng-Ching, H. (1995). Beyond Distance Teaching Towards Open Learning: A Conceptual Analysis of Transformation, Characteristics and Approaches, Journal of National Chung Cheng University Sec. I: Humanities 1995, Vol. 6 No. 1, 325-344

Miles M. B., Huberman A. M. (1994). Qualitative Data Analysis: An Expended source book. Thousand Oaks: Sage Publications.

Miller S., Miller K. (1999). Using instructional theory to facilitate communication in Web based courses. Educational Technology & Society 2 (3). URL:http://ifets.ieee.org/periodical/vol_3_99/miller.html

Moore, M., Kearsley, G. (1996), Distance Education A Systems View. Wadsworth Publishing, 1996.

Murphy K.L., Drabier R., Epps M.L.(1998). A Constructivist Look at Interaction and Collaboration via Computer Conferencing. International Journal of Educational Telecommunications 4(2/3). URL: http://www.aace.org/dl/files/IJET/IJET42237.pdf

Murray, B. (2000). Avoiding Web discussion pitfalls. Monitor on Psychology 31(4). URL: http://www.apa.org/monitor/apr00/reinventing_box.html

Ozkul, Ali Ekrem (2000). Anadolu University Distance Education System From Emergence to 21st Century. TOJDE, January 2001 ISSN 1302-6488 Volume: 2 Number:1.

Palloff, R., Pratt, K. (2000). Making the transition: Helping teachers to teach online.ERIC Document Reproduction Service No. ED 452 806. URL:http://www.educause.edu/ir/library/pdf/EDU0006.pdf

Parker, A. (1997). A distance education how-to manual: Recommendations from the field. Educational Technology Review, 8, 7-10. URL: www.webcom.com/journal/parker.html

Paulsen, M. F. (1997). The online report on pedagogical techniques for computer-mediated communication. NKI Electronic College, Norway URL:http://www.hs.nki.no/~morten/cmcped.htm

Phipps, R., Merisotis, J. (1999). What's the difference? A review of contemporary research on the effectiveness of distance learning in higher education. Institute for Higher Education Policy. URL: http://www.ihep.com/difference.pdf

Picciano, A. G. (2001) Distance Learning Making Connections Across Virtual Space and Time. Upper Saddle River, N.J.: Merrill Prentice Hall. c2001

Poling, D. J. (1994). E-Mail as an effective teaching supplement. Educational Technology, (34(5), 53-55)

Rossman, M. H. (1999). Successful online teaching using an asynchronous learner discussion forum. Journal of Asynchronous Learning Networks, 2, 91-97. URL:http://www.aln.org/alnweb/journal/Vol3_issue2/Rossman.htm

Sarah, H. (2001). Twelve Tips for Potential Distance Learners. Medical Education 23, Jan 2001: 12-16. Kimball, Lisa. "Managing Distance Learning—New Challenges for Faculty." Unpublished essay, 1998

Schlosser, L. A., Simonson M. (2002). Distance Education: Definition and Glossary of Terms, It will be published as "Teaching and Learning at a Distance:Foundations of Distance Education, 2nd Ed."(2003).

Simpson, C. (2000). Internet Relay Chat. ERIC Clearinghouse on Information and Technology Syracuse NY, ERIC Identifier: ED425743. URL: http://www.ericfacility.net/ericdigests/ed425743.html

Simonson, M., Smaldino,S., Albright M. (2000). Teaching and Learning at a Distance Foundations of Distance Education. Upper Saddle River, NJ: Prentice Hall, 2000.

Smerdon, E. (1996). Lifelong Learning for Engineers: Riding the Whirlwind, National Academy of Enginnering. The Bridge,Volume 26, Numbers 1 & 2 - Spring/Summer 1996. URL:http://www.nae.edu/nae/naehome.nsf/weblinks/NAEW4NHMJL?opendocument

Sorg, S., Truman-Davis, B., Dziuban, C., Moskal, P., Hartman, J., & Juge, F. (1999). Faculty Development, Learner Support, and Evaluation in Web-based Programs. Journal of Interactive Learning Environments, 7(2-3), 137-155

Stavritis, G. (2001). Web Based Training for the Hellenic Navy. MS Thesis, Computer Science , Naval Postgraduate School.

Sutton, L. A.(2001), The Principle of Vicarious Interaction in Computer-Mediated Communications. International JI. of Educational Telecommunications (2001) 7(3), 223-242.

Thach, E.C., Murphy, K.L. (1995). Competencies for distance education professionals. Educational Technology Research and Development, 43(1), 57-79.URL:https://courses.worldcampus.psu.edu/welcome/facdev101/course/instintro/instintr2.html

Tulloch, J. B. (2000). Sophisticated technology offers higher education options. T.H.E.Journal. URL: www.thejournal.com/magazine/vault/A3165.cfm

Vincent, P. (2000). Computer-mediated communication in undergraduate teaching: web-based conferencing with lotus notes/domino, Journal of Geography in Higher Education, Vol. 24, Issue 3

Vrasidas, C. (2000) Constructivism versus objectivism: Implications for interaction, course design, and evaluation in distance education. International Journal of Educational Telecommunications, 6(4), 339-362.

Vural, Fatos V. (1999). Bilgisayar Mühendisliği Bölümlerinde Ögretim Üyesi Açığı: Mevcut Durum ve Çözüm Önerileri. Türkiye Bilişim Vakfı. URL:http://www.tbv.org.tr/sayfalar.php?Bolum=egitimvebilisim&Sayfa=rapor

Wallace, L. (1996). Changes in the Demographics and Motivations of Distance Education Students. Journal of Distance Education, 11(1):1-31. URL:http://cade.athabascau.ca/vol11.1/wallace.html

Wegner, S., Holloway, K. C., Garton, E. M.(1999), The Effects of Internet-Based Instruction on Student Learning. Journal of Asynchronous Learning: JALN, 3 (2), 1-9, November, 1999.

Yazıcı, A., Altas, I.,Demiray,U. (2001). Distance Education on the Net : A model for Developing Countries. TOJDE, June 2001 ISSN 1302-6488 Volume: 2 Number:2

Ypsilandis, G.S. (2002). Feedback in Distance Education. Computer Assisted Language Learning, 2002, Vol.15, No.2, pp. 167-181

Yıldırım, H. (2002). Student Perceptions on a Web-Enhanced Introductory Chemistry Course: A Case Study. MS Thesis (unpublished), Computer Education and Instructional Technology Department, METU

APPENDIX A

Başvuru Formu

Kişisel Bilgiler:

Adı:	
Soyadı:	
Doğum Tarihi/ Yeri:	
Cinsiyet:	

Öğrenim Durumu:

Lise	Üniversite Öğrencisi	Üniversite Mezunu	Master Öğrencisi	Master Mezunu	Doktora Öğrencisi	Doktora Mezun

Öğrenci iseniz kayıtlı olduğunuz:

Bölüm/Sınıf	
Üniversite:	

Mezun iseniz :

Bölüm:	
Üniversite:	
Mezuniyet Yılı:	

Çalışıyor iseniz:

Mesleğiniz:	
Çalıştığınız Kurum	
Kurumun Adresi:	

İletişim Bilgileri

Adres:		
Telefon:	Ev veya İş:	Cep Tel:
Fax:		
E-posta:		

APPENDIX B

ÇEVRİMİÇİ ANKET

BÖLÜM-1

Bilgi Teknolojileri Sertifika Programı(BTSP) Hakkında Görüşler:

1) Bilgi Teknolojileri Sertifika Programı'na katılırken hangi faktörler bu eğitimi seçmenizde rol oynadı?
(Birden fazla seçenek işaretlenebilir)

- ☐ Bu eğitimi ODTÜ'nün sağlaması
- ☐ Eğitimin Internet üzerinden olması
- ☐ İşyerimin isteği
- ☐ Sertifika programı olması
- ☐ Konuya özel ilgi duymam
- ☐ Programın kariyerimde etkili olacağını düşünmem
- ☐ Diğer (belirtiniz)

2) Bilgi Teknolojileri Sertifika Programının etkili olmasını beklediğiniz konular nelerdir?
(Birden fazla seçenek işaretlenebilir)

- ☐ İş bulmak
- ☐ Branş değiştirmek
- ☐ Mevcut kariyerimde yükselmek
- ☐ Mevcut işimde daha verimli olmak
- ☐ Diğer (belirtiniz)

3) Bilgi Teknolojileri Sertifika Programının toplam ücreti nasıl buluyorsunuz?

- ☐ Yüksek
- ☐ Normal
- ☐ Düşük

2.BÖLÜM

Bilgi Teknolojileri Sertifika Programı(BTSP) `ındaki Dersler,Online Destek ve İletişim Araçları Hakkında Görüşler:

Derslerin Etkinliği Hakkında Görüşler:

Bilgisayar Sistemleri ve Yapıları Dersi	Görüşleriniz
Ders notlarında kullanılan dil anlaşılır ve açıktı	Seciminiz
Ders notları doyurucuydu	Seciminiz
Dersin konusu ağırdı	Seciminiz
Ders notlarında sık sık hataya rastladım	Seciminiz
Ders kitabı ve kaynaklar faydalı oldu	Seciminiz
Örnekler yeterli idi	Seciminiz
Örnekler konuyu anlamama yardımcı oldu	Seciminiz
Çokluortam uygulamaları yeterli sayıda idi	Seciminiz
Alıştırmalar konuyu anlamama yardımcı oldu	Seciminiz
Ödevler konuyu öğrenmeme yardımcı oldu	Seciminiz
Sınav soruları bilgimizi doğru olarak ölçer nitelikteydi	Seciminiz
Derste anlatılan konuları öğrendim	Seciminiz
Ders konuya ilgimi arttırdı	Seciminiz

Online Destek Hakkında Görüşler:

Bilgisayar Sistemleri ve Yapıları Dersi	Görüşleriniz
Dersin hocası takıldığım yerlerde yardımcı oldu	Seciminiz
Dersin asistanı takıldığım yerlerde yardımcı oldu	Seciminiz

Bilgisayar Destekli İletişim Araçları Hakkında Görüşler:

Bilgisayar Sistemleri ve Yapıları Dersi	Görüşleriniz
Ders hocası chat oturumlarının hepsine katıldı	Seciminiz
Ders asistanı chat oturumlarının hepsine katıldı	Seciminiz
Ders adresine (bsy@idea.metu.edu.tr,cpg@idea.metu.edu.tr) attığım mesajlarıma doyurucu cevaplar aldım.	Seciminiz

Chat oturumlarına katıldınız mı?

Cevabınız Evet ise, Chat oturumlarından faydalandım.	Seciminiz

Cevabınız Hayır ise, Nedeni?
(Birden fazla seçenek işaretlenebilir)

- ☐ Chat saatleri uygun değil
- ☐ Çekiniyorum
- ☐ Yararlı olduğunu düşünmüyorum
- ☐ Diğer (belirtiniz)

Tartışma grubuna katıldınız mı?

Cevabınız Evet ise, Tartışma Grubuna attığım mesajlara doyurucu cevaplar aldım.	Seciminiz

Cevabınız olumsuz ise;Nedeni?
(Birden fazla seçenek işaretlenebilir)

- ☐ Çekiniyorum
- ☐ Yararlı olduğunu düşünmüyorum
- ☐ Diğer (belirtiniz)

Derslerin etkinliği,online destek ve iletişim araçları ile ilgili düşüncelerinizi ve varsa problemlerinizi lütfen aşağıda belirtiniz.