AN ASSESSMENT OF AN ON-LINE COURSE ENVIRONMENT BASED ON THE PERCEPTIONS OF STUDENTS AND THE INSTRUCTOR: A CASE STUDY

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I certify that this thesis satisfies all the requirements as a thesis for the degree of Doctor of Philosophy.

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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 Doctor of Philosophy.

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ABSTRACT

AN ASSESSMENT OF AN ON-LINE COURSE ENVIRONMENT BASED ON THE PERCEPTIONS OF STUDENTS AND THE INSTRUCTOR: A CASE STUDY

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The purpose of this study was to explore the factors that contribute to online collaboration in a web-based course by investigating the impact and the potential of an online learning environment in terms of both the students' and instructor's perceptions about learner benefits, learner support, motivation, computer mediated communication, and group work. A mixed methods case study design was thought to be appropriate to match the purpose of the study, thus a combination of components normally found in descriptive, case study and qualitative research was used to analyze the data

The study was conducted in the context of "CSIT444-Online Web Design", an online course offered by the Institute of Distance Education of East Mediterranean University (EMU) in Turkish Republic of Northern Cyprus. This course was designed and developed by the instructor working at the Department of Computer Education and Instructional Technology of the Middle East Technical University located in Ankara and carrying out the classes for this course as online for the students at EMU. The participants were the instructor and 209 vocational education

last year students, who participated in the course for three successive semesters, at the School of Computing & Technology. In order to explore the perceptions of the students, they were asked to complete a questionnaire at the end of the each semester. Of the 209 participants 175 students ranked their agreement on each twenty eight five-point Likert-type item and 129 of them wrote also their comments about their online learning experience by answering the open-ended item in the questionnaire. Several interviews were conducted with the instructor using the informal conversational interview approach to explore his perceptions through his reflections on his online teaching experience in the web-based course. The perceptual student responses from the questionnaire were analyzed quantitatively. The responses to the open-ended item in the questionnaire and informal interviews were evaluated qualitatively to find out the emerging themes. In addition, the online learning environment offered in the web-based course was examined by using the instructional design framework.

This study concluded that both the students and the instructor perceived the online collaborative learning/ experience positively by reporting that it was a beneficial and motivating experience with the availability of group work, CMC, and adequate support structure. Several specific factors that contributed to collaboration via CMC in the web-based course were identified under seven major topics. By considering these factors, it is hoped that the results will yield better solutions in terms of providing meaningful online learning experiences.

Keywords**:** Distance education, online learning environment, computer supported collaborative learning, factors contribute to online collaboration, computer mediated communication, instructional technology.

ÖZ

BİR ONLINE DERS ORTAMININ ÖĞRENCİLERİN VE DERSİ VEREN ÖĞRETİM ÜYESİNİN ALGILARINA DAYALI OLARAK DEĞERLENDİRİLMESİ: BİR DURUM ÇALIŞMASI

GÜRBÜZ, Tarkan
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Bu çalışmanın amacı web tabanlı bir dersin çevrimiçi öğrenme ortamının öğrenciler ve öğretim üyesi üzerindeki etkilerinin öğrenci kazanımı, öğrenciye verilen destek, güdüleme, bilgisayara dayalı iletişim ve grup çalışması açısından incelenerek çevrimiçi dayanışmaya katkıda bulunan faktörleri araştırmaktır. Bu çalışmada karma yöntemli bir durum çalışması deseninin çalışmanın amacına uygun olduğu düşünüldüğünden veri analizinde betimsel, niteliksel ve durum çalışmalarında bulunan bileşenlerin toplamı kullanılmıştır.

Bu çalışma, Kuzey Kıbrıs Türk Cumhuriyeti Doğu Akdeniz Üniversitesi (DAÜ) Uzaktan Eğitim Enstitüsü aracılığıyla Ortadoğu Teknik Üniversitesi Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü öğretim üyesi tarafından Ankara'dan DAÜ öğrencilerine web üzerinden verilmek üzere tasarlanmış ve geliştirilmiş olan CSIT444-Online Web Design" dersi bağlamında yürütülmüştür.

Katılımcılar, dersi veren öğretim üyesi ve bu dersi birbirini izleyen üç dönem boyunca alan 209 Bilgisayar ve Teknoloji Yüksek okulu son sınıf öğrencileridir.

Öğrencilere, algılarını araştırmak amacıyla, her dönem sonunda bir anket verilmiştir. 209 öğrenciden 175'i 28 maddelik beşli likert tipi anket sorularını tercihlerine göre sıraya dizmiş ve aynı zamanda 129 öğrenci anketteki açık-uçlu soruyu yanıtlamıştır. Öğretim üyesinin web-tabanlı dersteki deneyimini nasıl algıladığını araştırmak amacıyla kendisiyle bir çok kez resmi olmayan görüşmeler düzenlenmiştir. Ankete verilen cevaplar niceliksel olarak, açık uçlu soruya verilen cevaplar ve görüşmeler ise temaları bulmak amacıyla niteliksel olarak analiz edilmiştir. Bunlara ek olarak web-tabanlı dersteki çevrimiçi öğrenme ortamı öğretim desen çerçevesi kullanılarak incelenmiştir.

Bu çalışmanın sonucunda hem öğrencilerin hem de öğretim üyesinin çevrimiçi dayanışmalı öğrenme ortamını olumlu bir şekilde algıladıkları ortaya çıkmıştır. Katılımcılar özellikle grup çalışması, bilgisayara dayalı iletişim ve dersle ilgili yeterli donanımın çevrimiçi öğrenmeyi yararlı ve güdüleyici olarak algılamalarına katkıda bulunduğunu belirtmişlerdir. Buna ek olarak bilgisayara dayalı iletişim yoluyla dayanışmaya katkısı olan pek çok etken bulunmuş ve bunlar yedi ana başlık altında toplanmıştır. Bu etkenler göz önünde bulundurularak çalışmanın sonuçlarının anlamlı çevrimiçi öğrenme deneyimleri sağlama açısından yararlı olacağı düşünülmektedir.

Anahtar Kelimeler: Uzaktan eğitim, çevrimiçi öğrenme ortamı, bilgisayar destekli dayanışmaya dayalı öğrenme, bilgisayar destekli birlikte çalışmaya etki eden faktörler, bilgisayar destekli iletişim, öğretim teknolojileri.

To my family

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CHAPTER 1

INTRODUCTION

As knowledge has grown, research, technology, systems and many other fields have witnessed significant changes in the last decade. These profound changes, showing a greater discontinuity with the past, are transforming the society into "Information Society" or "Knowledge Society". As a result of this rapid change, economy is also transformed into "Knowledge-based Economy" or so called "Knowledge Economy" where knowledge is the fundamental economic resource and learning is the most important economic process. Within this inevitable transformation, Information Technology (IT) has played a central role in the growth of the knowledge society. The basic assumption of knowledge society is that power is determined by the ability to analyze, process and utilize information and knowledge is the most important factor of wealth creation.

As the knowledge society develops, the global economy has had a deep impact on the working world. Nowadays, e-work, e-trade, e-cooperation are becoming increasingly common as a result of general economic, technological and organizational progress. More integrative work environments are created and the required management structures are more participatory than the hierarchical structures of the industrial age. Hence, many more people than before will become involved in technology, but they will be organized into many, smaller groups with primarily niche responsibilities (Heterick & Sanders, 1993). In the knowledge society that knowledge has to be highly specialized to be productive implies two new requirements: that knowledge workers work in teams, and that knowledge workers work as members of an organization (Drucker,1994). While talking about "teams" and "teamwork", one should not start with the wrong assumption that we have never

worked in teams before. Although people have worked in teams in all ages, so far the emphasis has been on the individual worker and not on the team. With knowledge work growing increasingly effective as it is increasingly specialized, teams become the work unit rather than the individual himself (ibid).

With this new understanding of teamwork, the reality of the work place environment in the 21st century is becoming more clear. Organizations and the virtual corporations are trying to strengthen communication and collaboration among their associates. Today, most of the tasks and projects are in a form hard to be accomplished without a team structure. Therefore, interdisciplinary teamwork is often necessary in most scientific and other professional work. Collaborative teams are more successful to provide a broad spectrum of knowledge and facilities to tackle complex problems.

This new workplace environment will require large numbers of highly skilled, reliable, and educated workers at every level of employment. In the knowledge age from the bottom level to the executive level these knowledge workers are skilled in a wide range of subjects and technologies, and have special teamwork skills such as; role definition, encouragement, support, communication, and cooperation.

During the industrial age, learning was assumed to be largely an individual activity and a consequence of formal instruction. However, today's reality supports that learning is a collaborative problem solving activity that involves far more than instruction alone. It occurs through progressive construction of individual knowledge, not simply through information transfer. Changing societal and workplace demands of our current century call for learning processes that support inquiry, self-reflection, problem solving, communication, and collaboration. This kind of learning process, at variance to those of industrial age, requires continual updating, so a top quality on-going education system is essential for living and working in the knowledge age.

In the knowledge society, education is central to personal, organizational and national well-being in terms of acquiring and applying knowledge which will be the key competitive factor. Whether we are ready or not, education system has entered yet another period of change driven by powerful, complex interplay of social, economic, and technological forces similar to those that influence the required skills and attributes of society. Future implies increased collaboration with community, institutions, and students. Then the focus in education will be on the learning and collaborative knowledge construction. Thus, the purpose of education will move from being curriculum driven to being learning centered (Carroll, 2000). Key aspects of the emerging pedagogy for the information society are emphasized as active, integrative, creative, collaborative, and evaluative (Thijs, A., et. al., 2001).

Increasingly, an educated person will be somebody who can adapt to change, who can work efficiently with others, who has learned how to learn, and who continues learning, especially by continuous education, throughout his or her lifetime (Drucker, 1994). The need for being continually engaged in some form of learning activity will force the development for new educational settings and infrastructure removing the boundaries created by time and space.

The evolution of computer technology continues to influence the way we live and learn in the 21st Century. Economic and Social Survey of Asia and the Pacific (1999) stated that information technology will continue to play a key role in social change as the knowledge society develops its information infrastructure. Recently, the term Information Technology has been replaced with the new term Information and Communication Technology (ICT). ICT emphasizes the technology's information and communication capabilities. The advent of ICT and networking systems has introduced new thresholds for research and development in how we move information from one place to another but especially in how we learn. Today we live in a society that is becoming increasingly dependent on the use of technology, specifically ICT. There are innumerable ways of using ICT and Internet technologies for instructional purposes in both conventional learning environments and distance education. Thus, the emphasis on lifelong learning will have a profound social

impact. In knowledge society, the education system will transcend the boundaries built in traditional education. Opportunities for distance and global learning will increase and the wider use of skilled specialist teacher resources in interactive distance learning will develop steadily. Educational attainments on a lifelong basis will be accorded high financial and social value.

The idea of education at a distance is not new; but, the form of an instructional paradigm is inevitably shifting to some form of a learning paradigm by the complex issues affecting the future of distance education. The advent of ICT and Internet technologies have revolutionized the distance education with the new forms of "web-based learning", "online learning", "distributed learning" or "e-learning". Recently, online distance education has become attractive for higher education institutions with the flexibility, convenience and the certain profitability of offering courses to the masses via the Internet. These developments will also open new horizons for those who are isolated by disabilities. The predicted eventual goal of distance education programs at higher education institutions would be to offer complete online degrees with the utilization of asynchronous and synchronous web-based technologies. With research flourishing across disciplines, the future holds promises for discovering uncharted territories in human learning and education.

Distance education is no longer just a distribution of materials. It involves two-way communication of some forms that are increasing in variety and it offers many advantages that are not readily available through traditional education and also making education accessible to the masses right at the tips of everyone's fingertips. Online education also enables "online collaboration" through "collaboration tools" and environments. Collaboration and collaborative learning, limited to generally classroom- based face to face environments in the past, is now enriched through computer-mediated communication (CMC). Access to such environments not only enables new ways of working and learning but also enhances collaborative learning by providing new opportunities for organizing collaboratively approached learning methods in distance education.

Crane (2000), stated that jobs in the future would focus on collaboration, project-based team activities, and the use of technology. Evolving into team-oriented environment requires the team members to obtain and learn knowledge and skills that may be new to them. The development of team assumes group learning experience (Palloff & Pratt, 1999; Mankin, et. Al., 1996). Therefore the students must have the opportunity to be involved in collaborative learning environment which are similar to the real world of teamwork (Riel, 1996). Collaboration helps students work on their social skills and their ability to work with others. Through collaborative learning strategies, students have shown improvements in self-esteem, race relations, mainstreaming, and student achievement and more (Slavin, 1995). With ICT and Internet development and popularization and experiences in computer supported learning environments computer supported collaborative learning (CSCL) has recently emerged as a new field (Koshmann, 1996). Students are supposed to experience CSCL through CMC in a team work while they are completing their education before they attain their degrees in order to gain valuable skills for today's job market. Their highly developed communication skills, understanding of teamwork, using technology, and respect for diversity will make them valuable to employers (Andres, 2000).

However, studies of higher education have shown that learners are not sufficiently prepared to enter the present global environment of teams and technology. The previous school experiences of students show some conflicts with collaborative projects. Individual work and independence are ingrained since students have been trained to view learning as an uncompromisingly individual process, not something to be shared (Gergits & Schramer, 1994). This conflict creates a contradictory gap between the present academic knowledge and the knowledge requested by firms outside world. Then, it is clear to understand now why firms and companies pay increasingly less attention to positional goods as university degrees, obtained through individualistic accumulation of "traditional knowledge", and pay increasing attention to expensive psychometric tests (Jenkins, 2001). As in many other curriculum studies a study in Turkey concluded that "the current job market realities require schools to do their own curriculum research and development in collaboration with the local business on a continuous basis" (Yıldırım & Şimşek, 2001).

It is inevitable to confront the changes in education. It seems that in all countries the education system is going through a dramatic change all over the world. Most countries take actions to assist local schools in focusing their energies and resources to meet the needs of the 21st century. These attempts reflect the same core proficiencies: problem solving, relational skills, professional communication, teamwork, applied academics, independent decision making, responsibility, quality, lifelong learning, resource location and management, cooperation and collaboration. It is these proficiencies that employees will require in the information rich work environments of the 21st century. Then certainly ICT must in some way be central to create new educational opportunities like exploration, knowledge share, connectivity and learner-centered environment. Besides adding new technology to create new educational opportunities, effort is necessary for changing the roles of the teachers, students, parents, and the roles of the administrators toward building new relationships and new structures (Carroll, 2000). The challenge is implementing effective reforms including time and space independent dynamic collaboration by means of the new learning technologies in order to define both the quality and the productivity of education.

1.1 Background and Rationale for the Study

The history of instructional development is about the confluence of research, technology, and systems (Shrock, 1995).

Research in education attempts to address questions or solve problems through the collection and analysis of primary data for the purpose of description, explanation, generalization, and prediction for understanding what goes on in education.

Technology affects how and what we learn and some of this new learning will, in turn, affect the evolution of technology. As the two interact, they will adapt to and change each other in complex and unpredictable ways (Norman 1993). Educational Technology emerged from the research on media during World War II is often used

synonymously with "Technology in Education" and "Instructional Technology". Technology in education simply means the application of technology to any of the educational processes whereas Instructional Technology (IT) is the body of work devoted to the uses of technology in instruction as a subset of educational technology. The progression in instructional technology has changed rapidly through many forms of presentation over the years.

From a systems view, if we examine how the instructional system develops through time, as Banathy (1996) suggests, we can see how the system engages in its transformation as a result of interacting with its environment. The instructional system, like other social subsystems, is located within the societal system of that time. Therefore, a paradigm shift of the societal system leads to a paradigm shift of the instructional system, cause development and restructure of instructional theories. Another force of change is located within the instructional system itself. It comes from the development of different learning theories which are the approaches reflecting the changing views of learning.

Constructivism builds upon behaviorism and cognitivism in the sense that it accepts multiple perspectives and maintains that learning is a personal interpretation of the world. The introduction of computers and communication technologies leads to decreases in teacher-directed activities and a shift from didactic approaches to a constructivist one in education. The power of connectivity that communication technologies bring us promotes this constructive transformation. In this transformation a new understanding of school community is emphasized where teachers become guides rather than dispensers of knowledge, and instructional practice places more importance on the role of the student in constructing knowledge. Constructivists also believe that much of reality is shared through a process of social negotiation.

Social negotiation and interaction occurs through communication, cooperation and collaboration. Moreover, recent constructivist learning theory also acknowledges and promotes the social and collaborative nature of learning. The focus in the future

knowledge society will be on the lifelong learning and collaborative knowledge construction in which we are engaged in. It will not be driven by a fixed, structured curriculum but by knowledge work in a networked learning community.

Modern methods of constructivist learning and holistic learning approaches and new understanding of school community as well as new communication technologies change the role of ICT in education too. Presently ICT is applied in the teaching and learning of various subjects by being widely integrated into the whole process of learning and into the entire system of education. Developing ICT and especially internet technologies enable support an interactive communication, and collaborative construction of knowledge, and also provide opportunities for distance education on behalf of life long learning. Furthermore, the students should have the chance to study independent of time and space. Some methods based on social constructivism can be applied in the classroom by cooperative learning activities and the use of technology. Access to the Internet in particular allows students and teachers to access more information and resources than were previously available and to communicate and collaborate with students and others outside their immediate area. With organizations getting global and the cost of travel for face-to-face collaboration getting higher and time consuming, it becomes more appealing to do research on computer based collaboration.

As people involved in education, we will take advantage of new communication resources as they become available, and remain on the cutting edge of digital and online communication. Computer mediated communication (CMC) has evolved since the late 1960's as an effective electronic means of connecting learners without time and location constraints (Machtmes & Asher, 2000). Different forms of CMC such as electronic mail, mailing lists, UseNet groups, and computer conferencing may collectively participate in a learning experience where the interaction is mediated.

The use of CMC as a teaching and learning tool has increased dramatically in recent years as more educational institutions gain access to the internet (Murphy, et al., 1996; Yıldırım & Kiraz, 1999). Traditionally, collaborative learning was studied in

classroom-based environment at first. Many studies mentioned the various aspects of classroom-based collaborative learning. Over time, interest has grown in the question of how technology might serve to support collaborative methods of instruction (Crook, 1994; Koschmann, 1994). In the meanwhile, some issues in collaborative learning were examined along with ICT and Internet technologies development and popularization (Kedong & Jianhua, 2001). There now appears to be a new paradigm emerging within instructional technology which is "Computer Supported Collaborative Learning" (CSCL). This developing paradigm focuses on the use of technology as a mediating tool within collaborative methods of instruction (Koschmann, 1996).

In recent years, the demand for CSCL research has grown as more and more institutions seek group support technology as a way to enhance the delivery of education and to improve both teaching and learning productivity. Conferences, workshops, and special seminars have been held with a focus on the developments in this emergent field of CSCL. Yet, little is known about the complex processes of CSCL. Recent studies of CSCL relied mostly on the experimental approach (Huynh, 1999). There are only a few studies which conducted an interpretive field study investigating the CSCL processes using the participant observation method and gave qualitatively analyzed results.

Although the advantages of collaborative learning as opposed to didactic teaching have been well promulgated (Herasim, 1990; Slavin, 1987 cited in Benbunan, 1997), more research is needed to explore how technologhy-mediated asynchronous interaction affects the collaborative learning process. As the literature suggests (Nunamaker, et.al,1992; Steiner, 1972 cited in Benbunan, 1997), groups are expected to outperform individuals working alone, but their potential can be adversely affected by coordination problems and other process losses that occur in group interaction. However, when this interaction is mediated by technology, some of the process losses can be overcome (Benbunan, R., 1997). The qualitatively analyzed results from the study conducted by Huynh (1999) provided supporting evidence that the CSCL environment liberates learning and promotes the emancipator learning. The group

literature also suggests that when technology is involved, online conditions will tend to outperform offline conditions (Benbasat and Lim, 1993; Pinsonneault and Kraemer, 1989, cited in Benbunan, 1997)

Recent research indicates the needs for further research to explore the nature of computer mediated communication and examine its potential in promoting collaborative learning. However, it seems that in order to effectively exploit new technology-based learning environments and corresponding cognitive practices, more systematic research on constraints and conditions of successful implementation of the CSCL should be carried out.

Pierre Boulez said recently, "The future is the present slightly modified." Each one of you can help us take a step forward into the future. The choice is yours. We have the technology. We have the knowledge. We have the support. Define your vision and make it happen (Carroll, 2000).

1.2 Purpose of the Study

The emerging pedagogy for the arrival of knowledge society emphasizes collaborative learning and teaching to provide the learners with the required skills for living and working in the knowledge age. Constructivist learning theory also promotes using collaborative learning environments. The rapid growth of the Internet and increasing use of ICT and specifically computer mediated communication pushed team work and team-oriented process both in business and education through online collaboration. Collaborative online learning environments are giving promises for both distance education and conventional education on behalf of lifelong learning. If the students have encountered online collaboration in the past, then being prepared to enter the world of teams and technology will make them more successful in their future life. The schools must integrate interdependent learning and abandon restrictive teaching methods encouraging online collaborative learning. Effective and efficient online collaborative learning environments should be

created in order to define both the quality and the productivity of education. Unfortunately, there are few examples of how to design and organize online learning environments. Then, the problem is to examine created collaborative online learning environments in terms of different aspects as much as possible with particular attention being paid to answer the questions unanswered presently.

Johnson (1996) argues that the lack of research into the effectiveness of technology is due to an inappropriate focus on programmed instruction and poor research design and execution. Little of the research identified was concerned with understanding learners' ideas about technology in general and, more specifically, about the ways it could be used in the classroom. One of the few investigations of student perceptions is part of the Apple Classrooms of Tomorrow (ACOT) program.

The main purpose of this study is to investigate both the students' and instructor's perceptions about the online learning environment offered in a web-based course.

Another purpose of the study is to explore the factors that contributed to collaboration via CMC in a web-based course.

1.3 Significance of the Study

There is a need to combine theory and practice in order to develop a viable teaching and learning model for web-based education. There is also a need to carefully observe the students' changes in behavioral styles and their perceptions to facilitate an effective online study environment. There is also a need to generate the corresponding teaching strategies so that other educators intending to conduct web-based courses can apply and construct their own experiences with them. There is no doubt that a well thought out framework for designing and running web courses will guide the development of better online courses. In order to carry on with the effort of developing effective online courses the observation and analysis of different

online courses seem to be essential for future applications. It is rather important to discover the issues of web learning communities and build a viable teaching and learning model for distance education since it can also be beneficial for those educators who are or will be teaching in these online learning environments.

This research study is intended to offer an insight to the practice of distance education, and provide a look through the opportunities and challenges that technology has brought to education by reflecting some aspects of online teaching experience.

Several researchers have argued that the fusion of collaborative learning and computer-mediated communication (CMC) technologies is mutually beneficial, since collaborative learning helps structure the on-line environment, and CMC technology removes many of the barriers to collaborative learning (David P Brandon, 1999, cited in Kedong & Jianhua, 2001). The experiences obtained in some examples of current successful web-based higher education courses will of course offer guidelines for educational administrators and practitioners in constructing their own programs in a better way so that students can benefit more from these courses.

This study is intended to contribute to knowledge in collaborative learning in the context of CMC. In the present study collaborative learning environment was explored in terms of students' interaction in their learning process and students' perceptions about their benefits, motivation, learner support, computer-mediated communication and group work.

Achieving the objective/s of this research study should be helpful in terms of understanding the instructor's and students' perceptions about CSCL environment supported with CMC. Moreover, perceptions gained from this study should shed light on the communication features and mechanisms in CSCL environment to provide useful ways for educators to take advantage of group support technology that enhances collaboration and consequently improves learning.

Advances in technology, indeed offers significant opportunities for creating powerful collaborative learning environments. However, instructors and students need to understand the technologies and learn how to take advantage of them to better facilitate the use of these environments. ICT and the Internet can be considered simply as environment enablers in organizational, educational and other settings, without the risk of over-emphasizing the role of technology. Pointing out the real actors as the teachers and students, not as the technology will be helpful to focus on the importance of participating in a collaborative online learning environment.

The creation of collaborative learning environments where future teachers are empowered to develop content, pedagogy, and technology strategies concurrently is a critical factor in the design of pre-service teacher education programs (Pierson & McNeil, 2000). The earlier teachers and students experience online learning in the education process, the better they will be equipped with the necessary skills to enter the world of teams and technology, which will make them more successful in their future life.

The results from this study should also provide an important groundwork for training today's students to be adaptive to the future workplace where a virtual teamwork will likely to be an integral part of the organization.

According to researchers at InterEd, as reported by McGinn (2000), 75 percent of all universities in US offered online courses with 5.8 million students attending virtual classes by the end of 2000. However, in a few months the eager higher education institutions were forced to scale back their initial attack into online education and modify their plans since their online programs have been struggling to attract students to enroll to their online courses. Now, there is an opportunity to examine prominent educational issues that were previously underestimated in all of the initial attempts. These circumstances provide guidelines for future research areas of online distance education in terms of many important elements of the whole educational process. Online distance education cannot be successful with the courses slightly modified from traditional courses. Transforming the old pedagogy to this new

environment just by carrying on the high-speed computer networks will not provide good applications (Özden, et al, 2000). The successful involvement of online education in higher education should be led only by the results of systematic research studies which examined the new technology-based learning environments and corresponding cognitive practices. Thus, this study aims at contributing to the understanding of CSCL learning environment in terms of perceptions of both instructor and students about CMC.

Economic and Social Survey of Asia and the Pacific (1999) emphasized that the countries lacking the necessary educational, research and design capabilities may become even more seriously disadvantaged in international competition. They will not be equipped to be a part of the knowledge society. In spite of numerous worldwide ICT studies the national research has to be carried out in order to implement ICT in an appropriate and efficient way for Turkey. Thus, this research study was conducted in an actual field setting in the course of a distant-independent educational initiative between two universities in Turkey and Turkish Republic of Northern Cyprus.

A broad research agenda is called for to gain a better understanding of the social, affective, and cognitive processes involved in computer-mediated collaborative learning since the entire field is so new (Warschauer, 1997). This research study is intended to explore the important factors in setting up online collaboration which would be helpful for improving classroom practices. This will be accomplished by analyzing five important factors that are assumed to be contributing to collaboration via CMC in a web-based course in terms of promoting online collaborative learning. These factors could be listed as follows: CSCL environment should be (1) beneficial for students' learning, (2) increasing students' motivation, (3) satisfactory for learner support, (4) promoting CMC, and (5) facilitating group work.

1.4 Definition of terms

In this section, definitions of terms used throughout the study will be introduced in order to assist the reader in understanding the study.

Computer Attitude: Computer attitude is defined as learned predispositions to respond negatively or positively to computers.

Computer Literacy: Computer literacy is considered as the basic knowledge and skills necessary for using computers and common applications for accessing, organizing, and presenting data and communication.

Computer Mediated Communication (CMC): It is a generic term that refers to a variety of systems that enables information exchange and communication. Such systems include electronic mail, bulletin boards, computer conferencing, discussion lists and forums.

Computer Network: A computer network is the linking of two or more computers. These computers may sit on the same desk next to each other or be in different parts of the world. Networks facilitate communication from one machine to another.

Information Communication Technology (ICT): It is a generic term covering computers, broadcasting, telecommunications, data networks and "smart" components, which are becoming increasingly common in all types of appliances such as cars, televisions and washing machines. It can be defined as the totality of the electronic means to collect, store, process and present information to end users in support of their activities. It consists of computer systems, data communication systems, knowledge systems, office systems and consumer electronics, as well as networked information infrastructures, the components of which include the telephone system, the Internet, fax machines and computers. (Economic and Social Survey of Asia and the Pacific 1999).

On line: "On line" means being connected to a network or in fact to the Internet. If you "go" on-line, you make that connection live and are able to send information across the Internet and get it back. Sometimes the term is also used to describe having access to electronic media generally.

On line learning environment: It is viewed as using the Web for the entire learning events that have traditionally occurred in the classroom. In this study, the following synonyms are used interchangeably to refer to online learning environment: Web-based learning environment, web-based course or web-based instruction.

Pre-service teacher: The one who is presently studying within a teacher education program but has not yet completed student teaching assignments.

In-service teacher: The one who is currently practicing teaching but has not yet completed the requirements for teaching credential.

CHAPTER 2

REVIEW OF LITERATURE

The literature was reviewed with a systematic survey of what is already known in the area of interest. In this chapter literature on changing views of education and learning, collaborative learning, technology in education, computer supported communication, computer supported collaboration, and distance education will be discussed. The present chapter will focus mainly on the relevant theoretical frameworks and studies on which this research is grounded in order to provide an intensive, comprehensive, and useful review.

2.1 Changing Views of Education

As stated by Merill and et. al., (1996) education and its related disciplines continue to flutter this way and that by every philosophical wind that blows. If we examine how the instructional system develops through time, as Banathy (1996) suggests, we can see how the system is engaged in its transformation as a result of interacting with its environment.

An educational system is a kind of social system. An instructional system is a subsystem of an instructional program, which is subsystem of the curriculum that is embedded in the educational system. The instructional system, like other social subsystems, such as governing systems, corporate systems, the armed forces, are located within the societal system of a particular time. Therefore, the paradigm of this specific human activity system influences the paradigm of the instructional

system, and consequently influences the development of instructional theories which are mostly used with the same meaning as instructional design theories. A paradigm shift of the societal system leads to a paradigm shift of the instructional system causing the development and restructuring of instructional design theories.

Any instructional system is an interdisciplinary subject matter that incorporates many disciplines including psychology, communications, education, the arts and sciences. With such diverse roots, it is easy to understand the differing orientations that have emerged in the field, such as behaviorism, cognitivism and constructivism.

The ultimate goal of the instructional system is to develop instructions that facilitate learning. In order to fulfill such a goal, the instructional system has to undertake a certain process. Moreover, the components of the system are selected for their ability to carry out the process in order to achieve the goal of the system. A generic process has been identified in the instructional system (Ho, 1999). The process includes the steps of analyzing needs, determining which content must be mastered, establishing educational goals, designing materials to reach the objectives, and trying out and revising the program in terms of learner achievement (Heinich, et al, 1993).

Like all science, the science of instruction is based on specific assumptions about the real world. Research in education is a disciplined attempt to address questions or solve problems through the collection and analysis of primary data for the purpose of description, explanation, generalization, and prediction (Anderson, 1990). Instructional science involves identifying the variables to consider (descriptive theory), identifying potential relationships among these variables (prescriptive theory), and then empirically testing these relationships in the field (Merill, et. al, 1996). The terms "quantitative" and "qualitative" are used to identify different modes of inquiry or approaches to research. Quantitative research presents statistical results represented with numbers; qualitative research

presents data as narration with words. Both quantitative and qualitative research studies are conducted in education (McMillan, Schumacher, 2001 p.14). Each of the commonly used scientific research methodologies, which are experimental, correlational, causal comparative, survey, historical and qualitative research in education, constitutes a different way of inquiring into reality and is thus a different tool to use in understanding what goes on in changing views of education.

The changes occurring within present society are so fast and so fundamental that each year brings a greater discontinuity with the past. Discontinuous change is not a new phenomenon. According to the Economic and Social Survey of Asia and the Pacific (1999) the shift from the agricultural age to the industrial age was driven by economic factors such as improvements in productivity resulting from better technology, including knowledge and skills, development of new sources of energy, and improvements in market mechanisms. The complex interplay of social, economic, and technological forces in today's reality are transforming the society into information society or knowledge society. These two terms have been used, almost interchangeably, by academics and other people. Riel (1996), however, indicated the difference by stating that "In the information age, factual information is plentiful. What is scarce is the intellectual work of giving value to information, of transforming information into useful knowledge systems."

The ICT revolution has an impact on this transformation likely to speed the transition of the world economy towards a knowledge-based economy or so called Knowledge Economy where knowledge is the fundamental economic resource and learning is the most important economic process.

The arrival of the knowledge age has changed the workplace. By the increasing use of technologies, specifically ICT and the internet, both business and education team work and team oriented process are being pushed. Organizations and the virtual corporations are trying to strengthen communication and collaboration among their associates. Team-work is required to solve problems.

This workplace will require large numbers of highly skilled, reliable, and educated workers at every level of employment. The developments of new conceptions of work and work competency have arisen out of the development of the knowledge society. Reports from the U.S. Bureau of Labor and Statistics indicate that the number of low-skill jobs is rapidly diminishing (see Figure 2.1).

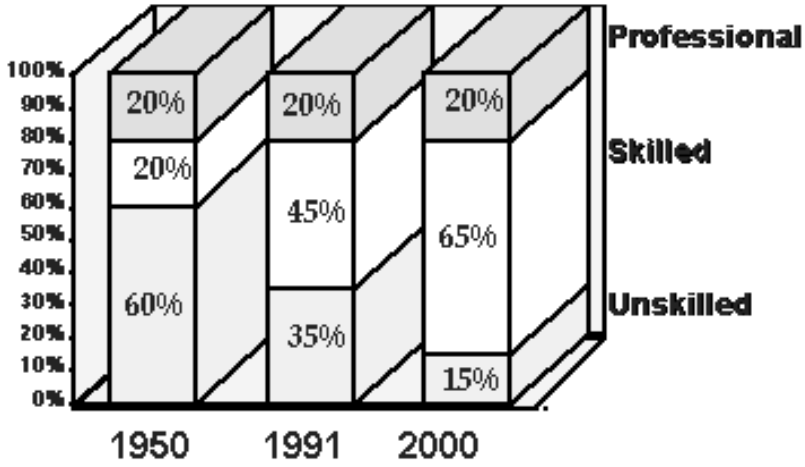

Figure 2.1 Labor Trends (The Milken Foundation, 2001)

The trends show that jobs in the future would focus on collaboration, project-based team activities, and the use of technology. Those who will work in this age should be skilled in a wide range of subjects and technologies, and should continually update their skills through on-going education. As Drucker (1994) has pointed out, the traditional industrial worker has been replaced by a `technologist', someone who works both with their hands and with theoretical knowledge.

The arrival of the knowledge age has changed the skills and attributes required of society and thus of the education system. Living and working in the knowledge age require a set of skills at variance to those of the industrial age. Five key aspects of the emerging pedagogy for the information society are active, creative, collaborative, integrative and evaluative learning. Trilling and Hood (1999) outlined what they believe to be the key Knowledge Age survival skills, as the seven Cs in Table 2.1.

Table 2.1. The Seven Cs: Knowledge Age Survival Skills

Seven Cs	Component Skills
Critical thinking-and-doing	Problem-solving, Research, Analysis Project Management, etc
Creativity	New Knowledge Creation, "Best Fit" Design Solutions, Artful Storytelling, etc.
Collaboration	Cooperation, Compromise, Consensus, Community-building, etc.
Cross-cultural Understanding	Across Diverse Ethnic, Knowledge And organizational Cultures
Communication	Crafting Message and Using Media Effectively
Computing	Effective Use of Electronic Information And Knowledge Tools
Career & Learning Self-reliance	Managing Change, Lifelong Learning and Career Redefinition.

(Trilling & Hood, 1999, p. 5)

During the industrial age, learning was assumed to be largely an individual activity and a consequence of formal instruction. Differences in individual levels of intelligence were regarded as hereditary and immutable (Abbott & Ryan, 1998). However, today's reality supports that learning is a collaborative problem solving activity that involves far more than instruction alone. It occurs through progressive construction of individual knowledge, not simply through information transfer.

The education system during the Industrial age was like a mass production factory in which students were expected to absorb knowledge in its exact original form. Students' ability to demonstrate subject competency, comprehension, or mastery of the material was somehow ignored. If this system of industrial era schooling does not meet the needs of today's learners and the demands of the knowledge age economy then we have a problem. If we have a system that does not fit our needs anymore, we must begin to think about how to transform the present educational system we have to meet our changing needs (Carroll, 2000).

Education in the 21st century will reflect the society that is currently forming. Education should be in a way to prepare students for this knowledge society to empower learners by showing them how to acquire knowledge in new situations. The need for being continually engaged in some form of learning activity will force the development for new educational settings and infrastructure removing the boundaries created by time and space. Table 2.2 presents a comparison of traditional pedagogy and an emerging pedagogy.

Table 2.2 Overview of Pedagogy in the Industrial vs. the Information Society

Aspect	**Less ('traditional pedagogy')**	**More ('emerging pedagogy')**
Active	• Activities prescribed by teacher • Whole class instruction • Little variation in activities • Pace determined by the program	• Activities determined by learners • Small groups • Many different activities • Pace determined by learners
Collaborative	• Individual • Homogenous groups • Everyone for him/herself	• Working in teams • Heterogeneous groups • Supporting each other
Creative	• Reproductive learning • Apply known solutions to problems	• Productive learning • Find new solutions to problems
Integrative	• No link between theory and practice • Separate subjects • Discipline-based • Individual teachers	• Integrating theory and practice • Relations between subjects • Thematic • Teams of teachers
Evaluative	• Teacher-directed • Summative	• Student-directed • Diagnostic

(Thijs, A., et al., 2001)

Indications are that in all countries the education system is being swept toward a dramatic change. Most countries act to assist local schools in focusing their energies and resources to meet the needs of the 21st century. These attempts reflect the same core proficiencies: problem solving, relational skills, professional communication, teamwork, applied academics, independent decision making, responsibility, quality, lifelong learning, resource location and management, cooperation and collaboration. It is these proficiencies that employees will require in the information rich work environments of the 21st century. Then certainly ICT must in some way be central to

create new educational opportunities like exploration, knowledge share, connectivity and learner-centered environment. Besides adding new technology to create new educational opportunities, effort is necessary for changing the roles of the teachers, students, parents, and the roles of the administrators toward building new relationships and new structures (Carroll, 2000). The challenge is implementing effective reforms including time and space independent dynamic collaboration by means of the new learning technologies in order to define both the quality and the productivity of education. Trilling and Hood (1999) have derived a list of common characteristics of Knowledge Age learning practice as in Table 2.3.

Table 2.3. Industrial Age vs. Knowledge Age Learning Practice

Industrial Age	**Knowledge Age**
Teacher-as-Director	Teacher-as-Facilitator, Guide, Consultant
Teacher-as-Knowledge Source	Teacher-as-Co-learner
Curriculum-directed Learning	Student-directed Learning
Time-slotted, Rigidly Scheduled Learning	Open, Flexible, On-demand Learning
Primarily Fact-based	Primarily Project- & Problem-based
Theoretical, Abstract Principles & Surveys	Real-world, Concrete Actions & Reflections
Drill & Practice	Inquiry & Design
Rules & Procedures	Discovery & Invention
Competitive	Collaborative
Classroom-focused	Community-focused
Prescribed Results	Open-ended Results
Conform to Norm	Creative Diversity
Computers-as-Subject of Study	Computers-as-Tool for all Learning
Static Media Presentations	Dynamic Multimedia Interactions
Classroom-bounded Communication	Worldwide-unbounded Communication
Test-assessed by Norms	Performance-assessed by Experts, Mentors, Peers & Self

(Trilling & Hood, 1999)

The skill demands of the Knowledge Age look quite different, the kinds of knowledge tools we now have at our disposal are much more powerful than those available even three or four years ago. What we now know about learning also supports the very styles of learning that will be necessary for success in the knowledge age.

These three Knowledge Age forces – the new demands for knowledge work skills, the new possibilities that our knowledge tools offer, and the support for new ways of learning from learning theory – are all converging on a new, alternative model of learning and education (see Figure 2.2).

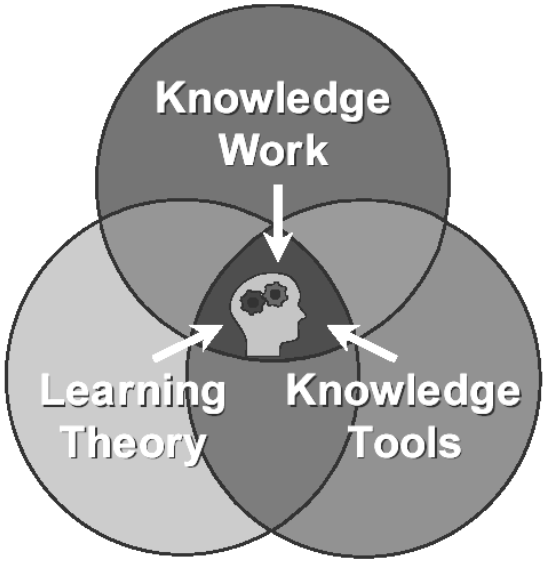

Figure 2.2. The Knowledge Age Learning Convergence (Trilling and Hood, 1999 p.15)

Another force of change, which comes from the development of learning theories, is located within the instructional system itself. A brief survey of the changing views of learning will be presented in the next section.

2.2 Changing Views of Learning

The question; "what is learning?" seems quite simple. However, philosophically it is a very hard question to answer, and that is why it has been a challenging topic for philosophers for centuries.

An attempt to review all the theories is beyond the scope of this dissertation; however, to mention historical development of learning theories will be helpful for understanding the change in paradigms on describing the development of learning.

Learning theories are the foundations of instructional-design theories. Development of different philosophical theories has an influence on the development of different learning theories. While philosophical theories are developed to gain an understanding of the world around us, learning theories are exploratory in terms of describing how learning occurs.

During the 20th Century, philosophers, psychologists and educators have attempted to provide coherent descriptions of how people learn. "The problems with which today's theorists and researchers grapple and struggle are not new but simply variations on a timeless theme: Where does knowledge come from and how do people come to know?" (Ertmer and Newby, 1993, p.4). The approaches taken during our century include changing views of learning.

Three main approaches "behaviorism, cognitivism, and constructivism" provide structured foundations for learning theories to understanding and describing learning. Learning theories provide instructional designers with verified instructional strategies and techniques for facilitating learning as well as a foundation for intelligent strategy selection (Mergel, 1998). Contemporary learning theories indicate that learning is achieved through a process of knowledge construction (Reeves 1993).

Constructivism builds upon behaviorism and cognitivism in the sense that it accepts multiple perspectives and maintains that learning is a personal interpretation of the world. Constructivist research takes as its central concern the issue of cognitive self-organization (Cobb, 1994). In so doing, it adopts the view of mind as a phenomenon residing within the head of the individual. This is a view that is deeply steeped in western philosophical traditions and that is foundational to most current research in psychology and education. It is not universally held, however. There are competing views that place the mind within the surrounding sociocultural environment.

There are many different views of constructivism as radical, social, physical, evolutionary, postmodern constructivism, social constructionism, information-processing constructivism and cybernetic systems. The modern view of constructivism builds on the theories of Jean Piaget, John Dewey, Lev Vygotsky, Jerome Bruner, and David Ausubel. Constructivists also believe that much of reality is shared through a process of social negotiation.

Social negotiation and interaction occurs through communication, cooperation and collaboration. A very important part of education is social experience, which requires learning how to communicate with and live within a democratic community. The work on collaboration in education is rooted in experiential learning and student-centered instruction, whose major proponents in this century have been philosopher John Dewey, and cognitive psychologists Jean Piaget and L.S. Vygotsky, each of whom advocated the creating of active learning contexts where students could successively reconstruct their understanding of the world around them. The modern view of constructivism acknowledges and promotes the social and collaborative nature of learning on the basis that meaningful learning will only take place if it is embedded in the social and physical context within which it will be used.

The changing views of both education and learning emphasize the need for collaboration and collaborative learning. In the next section collaborative learning will be discussed.

2.3 Collaborative Learning

"Collaboration" is a philosophy of interaction and personal lifestyle whereas "cooperation" is a structure of interaction designed to facilitate the accomplishment of an end product or goal (Panitz, 1996, p.1).

2.3.1 Collaborative versus Cooperative Learning

Collaborative learning (CL) is a personal philosophy, not just a classroom technique. Collaborative learning offers numerous advantages as an active learning strategy. Davidson (1994, p.14) lists five attributes, common to most practice of collaborative learning, as follows:

1. common task,
2. small-group learning,
3. cooperative behavior,
4. interdependence,
5. individual accountability and responsibility.

Cooperative learning is defined by a set of processes which help people interact together in order to accomplish a specific goal or develop an end product which is usually content specific (Panitz, 1996).

Table 2.4 contrasts the differences between collaborative and cooperative learning. These differences represent the details of practice rather than the differences in the

fundamental concept of working together to achieve shared learning goals (LeJeune, 1999).

Table 2.4. Differences between Collaborative and Cooperative Learning

Collaborative Learning	Cooperative Learning
Groups are self-supervised and group activities are self-organized	Work together in teacher structured groups
Group roles are defined by the group	Specific role assignments provided by the teacher
Instructor does not monitor group work and redirects group's questions back to the group	Instructor oversight and intervention during group work
Plenary sessions rather than group summaries	Instructor lead summary sessions
No training in small group skills	Training provided on small-group skills
No formal group processing sessions--group may provide their own reflection on processes	Group processing sessions to review group work and processes
Commonly implemented in higher education	Commonly used in K-12 academic environments

(Adapted from Matthews, Cooper, Davidson, and Hawks, 1995, cited in LeJeune, 1999)

2.3.2 Background and Previous Research Findings

Collaborative learning is a broad field of study. It is not a theory of learning in itself, but rather a collection of perspectives based on the principles of interpersonal interaction (Sorensen, 1997, cited in Fjuk, 1998). Although it is easy to recognize examples of collaborative learning, it is difficult to provide a precise definition. Hiltz (1995) defines collaborative learning as a learning process that emphasizes group or cooperative efforts among faculty and learners, and stresses active participation and interaction on the part of both learners and instructors (DeVilliers, 2001). Koschmann, (1996) cited that Bruffee (1993) described it as "a reculturative process that helps students become members of knowledge communities whose common property is different from the common property of the knowledge communities they already belong to" (p. 3). On the other hand, Roschelle and Teasley (1995) described

it as "the mutual engagement of participants in a coordinated effort to solve a problem together" (p. 70).

Collaborative learning is a process that encourages constructive discussion of ideas, collaborative argument, and interaction among participants especially when those participants begin the discussion with little in common (Kedong & Jianhua, 2001). It is associated with social constructivism and social constructionism in that the social aspects of knowledge imply that one gains and practices knowledge best in a social setting. From a social constructionist perspective as students share background knowledge and participate in the collaborative and cooperative activities they are actually negotiating meaning.

There is strong evidence that students need collaboration to be successful in difficult courses (Nespor, 1994).Collaboration helps students work on their social skills and their ability to work with others. It also increases student achievement and engagement. Learning is promoted through collaboration among students, and between students and teacher. Collaborative learning and team work is one of the desired skill for the Knowledge Age. CMC provide many opportunities both to the students and teachers like conducting research, and learning together through online discussions (Çağıltay, et al, 1995).

In collaborative learning, the instructor and learners adopt certain roles, and certain features characterize the learning process. Features of collaborative learning, given in Table 2.5, are based on the works of (Clarke, 1998; Cronjé, 1999; Hiltz, 1995; Johnson and Johnson, 1999; Jonassen and Reeves, 1996; Kafai and Resnick, 1996; Tam, 2000; and Watson and Rossett, 1999, cited in DeVilliers, 2001).

Through collaborative learning strategies, students have shown improvements in each of the areas such as student self-esteem, race relations, mainstreaming, and student achievement and more (Slavin, 1995). Students learn from each other through their conversations. Group work provides a forum for academic conversation at all levels. Students also gain valuable skills for today's job market.

Their highly developed communication skills, understanding of teamwork, and respect for diversity will make them valuable to employers (Andres, 2000).

Table 2.5. Features of collaborative learning

Role	Description of role
Role of the learner	• Assess, sequence and derive meaning from information. • Construct and generate their own knowledge. • Collaborate with other learners. • Act as planner, manager, guide, facilitator and participant.
Role of the instructor/ teacher	• Act as mentor and guide. • Encourage learners to work together to build a common body of knowledge, and accomplish shared goals. • Structure learning opportunities (act as planner, manager, guide, facilitator and participant). • Serve as a resource. • Create and maintain a collaborative problem-solving environment. • Assure assessment.
Characteristics of the learning process.	• Encourage and accept learner autonomy and initiative. • Use a wide variety of materials, including raw data, primary sources and interactive materials, and encourage learners to use them. • Inquire about learners' understandings of concepts before sharing his/her own understanding of those concepts. • Encourage learners to engage in dialogue with other learners and with the instructor. • Engage learners in experiences that show contradictions to initial understandings and then encourage discussion. • Provide time for learners to construct relationships and create metaphors. • Assess learners' understanding through application and performance of open-structured tasks.

(DeVilliers, 2001)

Collaborative studies of the design and evaluation of learning environments, among cognitive and developmental psychologists and educators, are yielding new knowledge about the nature of learning and teaching as it takes place in a variety of settings. Jonassen (1995) defines a rich learning environment using the following learning attributes: active, responsible, constructive, conversational, reflective, contextual, complex, intentional, and collaborative.

Most of the work in literature mentioned the various aspects of classroom-based collaborative learning, e.g., collaborative learning and student achievement, collaborative learning methods or approaches, group learning, interactive behavior, assessment and evaluation etc. Table 2.6 presents a summary of some previous research findings.

Table 2.6. Summary of research findings on the effects of the traditional collaborative learning.

Researchers	Research Findings on Collaborative Learning
Johnson et. al. 1981	Better mastery in subject matter
Hilke, 1990	Improvement on individual self-esteem and self-discipline. More development of leadership and communication skills.
Sharan, 1990	Higher level of learning motivation
Hamm & Adams, 1992	More respect for diversity. Better acquisition of literacy and language skills. Improving teachers' effectiveness.
Slavin et.al., 1985	Better interpersonal and inter-ethnic relations
Brandt, 1991; Johnson et. al., 1981; Slavin, 1983, Frierson 1986, Dansereau, 1983, Treisman, 1985	Higher level of achievement with consistently better performance. Higher Test scores, more effective learning of language, and development of high level thinking skills, decrease in students' attrition rates.

(Huynh, 1999)

2.3.3 Problem/Project Based Activities

The effect of changing views in education is that students become more active and independent in their learning and spending more time on project-based, collaborative and individualized tasks. This appears to be accompanied by a complementary shift in the role of the teacher to more of a facilitative, managerial approach (Bennett & Lockyer, 1999).

Follansbee et. al.,1996, found that students with online access reported more frequent use of computers over the course of the study for the types of school work that are most closely related to a project-based unit of study - e.g. assisting with basic

tasks, gathering information, organizing and presenting information and creating multimedia packages (cited in Bennett & Lockyer, 1999).

Follansbee et. al. (1996) conducted an experiment which compared learning outcomes of project-based tasks for students with and without online access. The researchers found that students with online access became more confident in carrying out and presenting the research project(cited in Bennett & Lockyer, 1999).

Internet–based collaborative activities, during which students may work either with classmates or others beyond the classroom, receive particular attention. Wiesenmayer and Koul's (1998) survey of RuralNet teachers reports increased use of hands-on, project-based, investigative activities in which the Internet is used to support collaboration with others both in and outside the class (cited in Bennett & Lockyer, 1999). Becker (1997) describes students' collaborative involvement in writing projects with distant classes, live events such as field trips, and Internet publishing (cited in Bennett & Lockyer, 1999).

If we start to push our thinking about what the educational system could become, we begin to have some idea of the opportunities before us and the work required to realize those possibilities. As we see in the next section, these alternative views have important implications for education and the use of technology therein.

2.4 Technology in Education

As a relatively new field of specialization, in the field of educational technology there is no clear cut boundary. There are contributions to this field from fields of psychology, system theory, communication, leadership and management, and science and technology, in order to improve human learning and human performance. Thus, its theoretical research is an interdisciplinary one, encompassing learning and cognition; instructional design theories and models; instructional strategies and

tactics; instructional media, educational systems design, development and evaluation, system change and leadership, etc. In short, Educational technology is about how to improve human learning and performance in diverse contexts in an efficient and cost effective fashion.

2.4.1 Historical Background

Technology in education is an extremely broad topic that studies the historical progress of technology's changing how we learn, how we express ourselves, and how we perceive and interact with our world in terms of how technological resources were employed by administrators, teachers, and students. The development of any technology emerged from events in the history have all affected the field of education. From the research on media during World War II, two new academic fields emerged, Communication Arts and Educational Technology (DeVaney & Butler, 1996).

The term "Educational Technology" is often used synonymously with Technology in Education and Instructional Technology. According to the Association for Educational Communications and Technology these terms do not mean the same however. Saettler recalls that it was W. W. Charters who used the term educational technology, and James Finn was often considered to be the first one to write the term instructional technology (Saettler, 1990, p. 17). Technology in Education simply means the application of technology to any of the educational processes. Instructional Technology as the body of work devoted to the uses of technology in instruction is a subset of Educational Technology, so it does encompass all of the processes involved in Educational Technology. Instructional Technology as a field has gone through several stages in its evolution. It began as visual education, moved to audiovisual education and developed into instruction or educational technology. Its intellectual history is a blend of ideas from a variety of foundational disciplines in addition to the concepts attributed to research and theorizing by those within the field itself.

Technology in education as a multidisciplinary field stretches into many arenas in terms of multitude of applications of different technologies. The progression in instructional technology has changed rapidly through many forms of presentation over the years. In 1962 Robert Glaser synthesized the work of previous researchers and introduced the concept of "instructional design", submitting a model which links learner analysis to the design and development of instruction. Instruction is a science and instructional design is a technology founded in this science (Merrill, et.al., 1996). "Most educational researchers seem to agree that; technology can have a significant positive impact on learners if it's used in the right way" (Weiss, 1994, p. 1).

Throughout the Twentieth Century, educators have experimented with a variety of learning models that integrated technology. Norman (1993) stated that "Technology will affect how and what we learn. And some of this new learning will, in turn, affect the evolution of technology. As the two interact, they will adapt to and change each other in complex and likely unpredictable ways"(p.48). It is the revolution in technology that has simultaneously brought about the need for improvements in learning as well as providing the opportunity to improve "learning environments". New technologies will enhance learning particularly for children through "the creation of personal media capable of supporting a wide range of intellectual styles"(Papert, 1993, p.1).

Instructional Technology as a field has gone through several stages in its evolution. It began as visual education, moved to audiovisual education and developed into instruction or educational technology. Its intellectual history is based on a combination of ideas from a variety of disciplines in addition to the concepts attributed to research and theorizing by those within the field itself.

Until recently, the prevalent philosophical orientation in instructional technology was instructivism (Duffy & Jonassen, 1991). Instructivists (sometimes also referred to as objectivism or the systems view) argue that using an instructional systems design model can be useful to instructional designers to systematically identify what is to be

taught, determine how it will be taught, and evaluate the instruction to determine if it is effective.

Although Instructional Technology has always had a strong orientation toward practice (Richey, 1997), the findings of early researchers have often exerted influence over new directions in the field. Edgar Dale's (1946/1996 cited in Solomon, 2000) "cone of experience" predates virtual reality and the contemporary constructivist movement; yet, his proposition that reality is the basis of all effective learning supports these movements that value authentic learning environments.

Instructional Technology is a confluence of many disciplines including education, communications, the arts and sciences. With such diverse roots, it is easy to understand the differing orientations that have emerged in the field, such as behaviorism, cognitivism and constructivism.

Instruction involves directing students to appropriate learning activities; guiding students to appropriate knowledge; helping students rehearse, encode, and process information; monitoring student performance; and providing feedback as to the appropriateness of the student's learning activities and practice performance. Instructional design is the technology of creating learning experiences and learning environments which promote these instructional activities.

Many disciplines have contributed to the development of the instructional design field. These disciplines include psychology, communications, education, and computer science (Seels & Glasgow, 1990, cited in Ho, W., 1999). Andersen (1990) argue that systems design can be regarded as research, since there is no clear difference, on grounds of principles, between the practice of systems design and research. The main difference is, however, related to the object of the activity. The practice of systems design results in products and, research results in knowledge (ibid.).

2.4.2 Using New Technologies to Change Education

Every time a new technology comes along, it takes a while to establish what it does best. The natural tendency is to replicate methods that are familiar in other media. For example, the first uses of computer technology in classrooms have typically involved PowerPoint presentations that take transparencies created for overhead projectors and organize them into a choreographed presentation. Although there are animations and additional colors to spice up the screen, the basic teaching activity associated with PowerPoint is not very different from lecturing with an overhead projector or a series of handouts. Many people find it easy to transfer their teaching notes to PowerPoint slides for projection on a classroom screen. This medium often lends itself to transmitting knowledge, or describing methods. It can summarize large concepts quickly, but the bulleted lists are only the starting point. Instead of producing glorified overheads, computers should be used to teach in ways that would be impossible without computers (Cannell, 1999).

It is believed that there are four roles that a computer can perform in teaching. The computer can serve as a storyteller, an analyzer, a coach, or an evaluator. These roles map nicely to Kolb's learning styles. A storyteller provides access to a wealth of experiences. An analyzer guides reflection. A coach conveys heuristics. An evaluator supports experimenting. In each case, computers can enable students to pursue whichever learning styles most appeal to them. There occurs some boundaries in traditional education like the boundaries between students and teachers, between students, between courses, and boundaries of time and space. Focus should be on using technology to transcend the boundaries built in traditional education (Cannell, 1999).

ICT and the new Internet technologies may offer many opportunities by redefining the roles of instructors and students, and changing the traditional learning processes and education systems. The literature on changes in instructional strategies and

practices somewhat mirrors the changes in learning activities as learners have become more active and independent, and teachers have taken on a more facilitative role.

The Internet has much opportunity to offer education on the condition that it is presented in a controllable and meaningful way. The Internet allows teachers and students to access more resources and information than were previously available. Teachers using the Internet were more likely to report changes in teaching practices, compared with non-users and those who had their students' use supervised by a media specialist. (Becker, 1997, cited in Bennett, & Lockyer, 1999).Teachers with high access tended to be more constructivist in their approach to teaching and learning, while those with low access tended to be more teacher-directed. While not claiming that this indicates a cause-and-effect relationship between access and pedagogical approach, Heflich argued for increased attention to this issue (Heflich, 1996, cited in Bennett, & Lockyer, 1999). Teachers held similar beliefs about technology's place in the curriculum. They taught students how to use technology for curricular ends and considered technology to be one tool among many, integrated as appropriate into all classroom activities (Hughes, 1998, cited in Bennett, & Lockyer, 1999). Technology in the classroom has changed the ways in which teachers use resources, with teachers often re-packaging and re-purposing existing materials. As a result of the introduction of technology in the school many teachers were developing their own hypermedia materials (Yıldırım, 1999; Bernauer, 1996, cited in Bennett, & Lockyer, 1999). Follansbee et. al. (1996) found that teachers with online access appeared to have increased their personal Internet use from the beginning to the end of the study, whereas teachers without online access appeared to have made no change (cited in Bennett, & Lockyer, 1999). The studies cited here indicate that the introduction of technology may prompt teachers to re-examine and change both their teaching practice and the way they think about teaching and learning.

The findings of recent years show that the efficiency of ICT depends not only on software features, but also on compliance of new technological tools with educational targets, student's features, and the methods of the integration (Research Report, 2000, cited in Markauskaitè, 2003). The ease of access, including availability

of equipment and connection to the Internet, is a determining factor in the extent to which technology is integrated with teaching and learning (Heflich, 1996, cited in Bennett, & Lockyer, 1999).

A review of the recent research literature related to the impact of digital technologies on teaching and learning indicates changes in a number of key areas, including teachers' and learners' perceptions, learner motivation, teaching and learning activities, learning outcomes, access and infrastructure, technology uptake and professional development.

As professional development programs tend to accompany technology implementation, it is unsurprising to note the emphasis in the literature on strategies for preparing teachers to use the technology in the classroom. The technology itself, especially the Internet, may offer new opportunities for professional development through access to information, such as lesson plans and resources, and contact with colleagues. The use of an on-line environment to facilitate teachers' professional development should be promoted. Using technology successfully requires a constant and consistent training program. This should begin as part of a pre-service training program and continue throughout a teacher's instructional career (Mason, et. al., 2000). In order to take the advantage of new technologies and the investment in equipment for schools; teachers should also be prepared in a different way compared to the past.

Some teachers believed that they were losing control of the instructional process and that their role in the classroom was being compromised by the new generation of technology expert students. Many teachers became "rejecters" of instructional technology at this point, saying, "I tried it, and it didn't work for me," or "It increased my work load substantially," and similar things (Sherry & Gibson, 2002).

Technology is a tool to help teachers engage students. It brings inquiry-based activities into the classroom. Therefore, it makes the curriculum more student-centered, and thus less teacher-centered. Carroll (2000) states that "education is

rapidly moving toward new learning environments that will have no teachers or students—just learners with different levels and areas of expertise collaboratively constructing new knowledge" (p.126). "Teachers, mentors, and conference moderators become facilitators, translators of the professional vocabulary, and expert learners working alongside novices" (Sherry & Gibson, 2002, p.202). "New learning teams are emerging, which consist of college faculty, the teacher candidates, and the in-service teachers" (Carroll, 2000, p.125). Thus, the relationships among all of the learners in the system form a networked learning communities or communities of practice (Carroll, 2000). New technologies in education should not be seen as technical issues, but rather in terms of how the technology helps learning as an effective means of involving exponential numbers of students and teachers in collaborative projects.

New technologies indeed provide powerful learning opportunities, but instructors and students need to understand the technologies and learn how to take advantage of them. Moreover, it is well known that any organization that adopts a new technology without significant organizational change will end with failure. Organizational change is necessary. Besides adding new technology to create new educational opportunities, effort is necessary for changing the roles of the teachers, students, parents, and the roles of the administrators toward building new relationships and new structures (Carroll, 2000).

Given the extent to which new technologies have influenced educational practice, it is very important that researchers investigate how technology influences learning and teaching. These investigations on how new technologies might contribute to learning should reflect recent changes in the nature and methods of research on technology (Mason, et.al., 2000).

Economic and Social Survey of Asia and the Pacific (1999) explains that, "Information technology processes and packages information, and telecommunications allow information technologies to interact with other information technologies and remote devices in networks, permitting users to access

databases and communicate with other users over long distances" (chapter 4, p.1). "It is this combination of information technology and telecommunications into ICT that defines the global information network and the development of a global information infrastructure (chapter 4, p.2).

ICT and the Internet together provide the opportunity for communication and collaboration with others, which leads to enhanced social communication. In the next section computer mediated communication will be discussed.

2.5 Computer Mediated Communication and Learning

The advent of network and groupware has extended group interaction beyond the constraints of time and space. The cybernetic community was born in the midst of the rapid growth in the Internet, the widespread use of ICT, and the development of advanced collaborative applications. People from all corners of the world are now able to meet, chat, work, and interact in a virtual meeting place within a computer mediated world. In effect, this convergence of computing, communication, and knowledge has completely transformed the very nature of group interaction. Communication technologies support an interactive construction of information. The consequences of this transformation are particularly significant in educational practice (Huynh, 1999).

In spite of the attempts of trying to use modern learning technologies to move away from the one-way, broadcast mode of instruction, technology is still being used in education to reinforce one-way communication and passive modes of learning. Accessing information and delivering it effectively are not sufficient. Information must be shared, analyzed, and applied through dialogue and examination of differing perspectives. This happens seldom enough in face-to-face classrooms; there is evidence that it might be possible in distance education with the advent of interactive and interconnected communication technology (Cannell, 1999).

With modern learning technologies, it is possible to move toward a two-way interactive communication that enables learners at many levels to collaboratively construct knowledge (Carroll, 2000). The transformation in education will be possible with the help of using the communication technologies for two-way interactivity that allows constructing the learning experience and new knowledge collaboratively. In this transformation it is very important to encourage individuals to learn and work collaboratively using these communication technologies together with other technologies.

Computer Mediated Communication is a generic term that refers to a variety of systems that enables information exchange and communication. A working definition of CMC is "communication between different parties separated in space and/ or time, mediated by interconnected computers" (Romiszowski & Mason 1996, p.440). Such systems include electronic mail, bulletin boards, computer conferencing, discussion lists and forums. CMC builds on and maintains social and community relationships. Such devices bring the student and teacher closer together and foster cooperation and collaboration between students.

It is important to identify the issues and trends in the field of CMC to understand its effect on the learning environments. Therefore, further research is necessary to explore the nature of CMC and examine its potential in promoting collaborative learning.

Turoff (1991) stated that a CMC system should offer the flexibility of being used synchronously and asynchronously. It needs to support group communications independent of time and space. As long as these systems are flexible and adaptable to group needs, they will be more likely to be used by the group. One of the objectives of a CMC system is to provide an opportunity for a group to exhibit "collective intelligence". Another objective is structuring CMC systems to avoid "information overload" by facilitating access to sources of information relevant to the task at hand (Hiltz, & Turoff, 1985). Necessary mechanisms to deal with information overload and the ability to deal with large user populations and large group size should be provided in the design of CMC systems (Turoff,1991). Hiltz, & Turoff (1985) stated that the options for filtering and sorting out the information should be given to the users. The individual and group

differences are important concerns. Turoff (1991) emphasized that the CMC system should be designed for the ability to support human roles and should be based on privacy, security, and reliability it provides.

In education, CMC systems are used not only for distance education but also for more convenient communication on the same campus. Applications include utilization of CMC as a principal mode of instruction and communication between tutors and students for whole courses, and the use of CMC as a support medium for enrichment in conventional courses (Romiszowski & Mason 1996, p.440).

Warschauer (1997), concluded that the special features of online communication--that it is text-based and computer-mediated, many-to-many, time- and place-independent, and distributed via hypermedia links--provide an impressive array of new ways to link learners. When viewed in the context of socio-cultural learning theory, which emphasizes the educational value of creating cross-cultural communities of practice and critical inquiry, these features appear to make online learning a potentially powerful tool for collaborative language learning.

Researchers Doughty (1991), Schmidt (1993), Crookes (1989), Sharwood and Smith (1993) (all cited in Warschauer (1997) have investigated the psycholinguistic effects of features such as noticing and planning. Results indicated that written communication obviously allows different opportunities for noticing input and planning output than oral communication does.

One of the problems identified in the educational uses of computer conferencing is that of teacher workload. Hiltz (1988), noted that teaching an on-line course, at least the first time, was a bit like parenthood. "You are 'on duty' all the time, and there seems to be no end to the demands on your time and energy" (Hiltz, 1988, p. 31 cited in Romiszowski & Mason 1996, p.440).

CMC holds considerable benefits for adult learners. Further benefits are shown in Table 2.7.

Table 2.7. Benefits of CMC for learning.

Category	Benefit
Communication	• Learners are given the opportunity to refine their communication skills, and think critically and creatively. • CMC enhances the exchange of academic discourse and is a good sounding board for ideas and excellent for networking purposes.
Sense of anonymity	• Learners share larger quantities of information than in a traditional classroom, due to the sense of anonymity that prevails.
Greater flexibility	• Independent of time • Learners' disabilities, such as an inability to hear, see or move need not be a limitation in electronic communication.
Access	• Learners from impoverished backgrounds can be given access to rich learning environments and form part of stimulating communities of learners via lowcost Internet and web tools.

(DeVilliers, 2001)

However, despite the efficiency of Internet resources such as discussion lists, real time chat and bulletin boards to deliver messages, the delivery of messages, in itself, is not sufficient to ensure learning (Hewson & Hughes, 1998 cited in DeVilliers, 2001). Hiltz and Wellman (1997) reported certain limitations of CMC with regard to web-based classrooms (cited in DeVilliers, 2001). These limitations are given in Table 2.8.

Table 2.8. Limitations of CMC for learning

Category	Limitation
Social-emotional	• Limited by lack of visual and social cues and presence. • Good for communicating information, opinion and suggestions, but less suited to communicating agreement or disagreement. • Normless behaviour can result unless there is a clear identification and monitoring of acceptable rules and conventions.
Procrastination	• The flexibility of asynchronity may result in procrastination when learners are too busy to log on regularly, which can result in falling behind with regard to deadlines.
Non-participation	• Some learners may take on the role of a "lurker", simply observing, learning from the others, but not giving their own input.
Management	• Large groups with high levels of interactivity can trigger information overload unless communication tools provide adequate management of information.
Access	• It may be argued that CMC in the 21st century will benefit mainly the technological "haves" rather than the "have-nots". That is, opportunities for the world's population are, and are likely to remain severely limited for some time(Lewis et al, 1995).

(DeVilliers, 2001)

The literature suggests that the nature of CMC promotes and facilitates collaborative learning. However, studies addressing how students communicate in their learning process and how this communication relates to collaborative learning in a CMC context are limited.

Communication and collaboration can range from asynchronous, where an interactive activity is separated by long periods of time (e.g. e-mail, discussion groups), to synchronous, where an interactive activity is simultaneous and in real-time (e.g. video conferencing).

Synchronous collaborative systems are not as common as asynchronous systems. One of the most widely used synchronous collaborative technologies is telephony, where two or more people can remotely talk to each other in real-time. Shared whiteboards, chat tools, collaborative editors, video conference systems are only some of the computer based synchronous collaborative systems beginning to emerge recently.

Developing new technologies provides opportunities encouraging experiences in computer supported learning environments. Interest has grown in the question of how technology might serve to support collaborative methods of instruction. Next section will provide knowledge and experiences related to online collaborative learning or so called computer supported collaborative learning (CSCL). A summary of the technological benefits and limitations of CMC is given in Table 2.9.

Table 2.9. Technological benefits and limitations of CMC, and its design implications.

Type	Benefits of CMC	Limitations of CMC	Design implications
General	Quick delivery	Possible misinterpretation	Use emoticons
	• Reliable delivery • Accurate (digital) transfer	• Unstable technology, i.e. - networks can be unstable; - possible time delays • Lack of non-verbal cues	The remote network and host network must be stable before the course begins.
	Inexpensive	• High initial cost • Maintenance, upgrade and training costs	Problems likely to decrease in future as bandwidth and connectivity improve and costs come down.
	Availability	Limited accessibility	Develop information kiosks
	Disputes broaden learners' horizons and develop character and interpersonal skills.	Disputes and disruptions may result in hurt individuals.	• Foster an open and interdependent exchange (Winiecki, 1999). • Use "netiquette" guidelines to guide behaviour • Create a policy for handling disputes and disruptions (McLellan, 1999).
	Competent individuals feel comfortable with the technology	Individuals with inadequate skills battle to use the tools to facilitate learning	Teach technology skills where necessary.
Discussion list/bulletin board	• Easy to store, forward, save and sort, in the case of discussion lists • Permanently available in the case of bulletin boards	Can generate co-ordination problems, e.g. information overload. Learners may feel overwhelmed by the quantity of information.	Maintain strict discipline in terms of subject headings and message threading.
Real time chat	Fun way of communicating	Emotionally frustrating for learners who cannot access the chat room or who cannot type quickly.	Plan practice sessions
	Almost immediate	Message overlap	• Let learners take turns to communicate. • Plan practice sessions.
	Learners free to be themselves, due to the informal nature of the medium	"Chats" are not necessarily saved permanently.	Summary of chat can be sent on the discussion list/bulletin board, to confirm discussion.

(DeVilliers, 2001)

2.6 Computer Supported Collaborative Learning (CSCL)

New information communication technologies expand enormous opportunities for individual and group learning. They offer multi-sensory, reflective, and collaborative learning environments unconstrained by time, place and formal structures. With organizations getting global and the cost of travel for face-to-face collaboration getting higher and time consuming, it is becoming more necessary to do research on computer based collaboration.

The rapid growth of the Internet and increasing accessibility of computer and communication technologies encourage experiences in computer supported learning environments. Interest has grown in the question of how technology might serve to support collaborative methods of instruction (Crook, 1994; Koschmann, 1994a cited in Koschmann, 1996). Online collaborative learning, also referred to as Computer Supported Collaborative Learning (CSCL), has recently emerged as a new field. Recently there has been a surge of interest in the field of CSCL. As a result, a number of CSCL systems are being developed.

Two major theoretical perspectives that have dominated pedagogical development and have received attention in CSCL research (O'Malley, 1995; Dillenbourg et. al., 1995 cited in Fjuk, 1998) are the cognitive theory derived from the Swiss psychologist and philosopher Jean Piaget and, the socio cultural theory derived from the Russian educationist and psychologist Lev S. Vygotsky. In this section, these two perspectives are presented and discussed from the perspective of CSCL..

However, many other theories also contribute to our understanding of CSCL. Hsiao, (1996) lists these theories as: sociocultural theory (based on Vygotsky's intersubjectiveness and Zone of Proximal Development), constructivism, self-regulation learning (skill, will, and execute control), situated cognition, cognitive apprenticeship, problem-based learning, Spiro et al.'s (1988, 1991) cognitive

flexibility, and Salomon et al.'s (1993) distributed cognition ("effect of" and "effect with" technology).

CSCL has grown out of wider research into computer supported collaborative work (CSCW) and collaborative learning (Hsiao, 1996). Both CSCL and CSCW are based on the fact that computer supported systems can facilitate group process and group dynamics that are not achievable easily by face-to-face communication. However, they are not designed to replace face-to-face communication. CSCL and CSCW systems can be used by multiple learners across networked machines or working at the same workstation. These systems can support communicating information and ideas, accessing documents and information, and providing feedback on problem-solving activities. The research of CSCL and CSCW covers not only the techniques of the groupware but also their social, psychological, organizational, and learning effects. Presently, hypermedia/hypertext and CSCW are most widely used technologies for developing computer-based learning environments. However, these technologies have related but different interests. Hypermedia/hypertext technology is widely used to conquer the linear structure of information by allowing non-linear integration of information chunks, which may be represented by different forms of media such as text, audio, video, image, graphics, etc (Yıldırım, 1999). The rapid development of these technologies provides support for developing advanced collaborative learning environments. However, this study will focus mainly on CSCL after stating the differences between CSCW and CSCL. These differences mentioned by (Hsiao, 1996) are presented in Table 2.10.

Table 2.10. The differences between CSCW and CSCL

CSCW	**CSCL**
• tends to focus on communication techniques themselves • is used mainly in the business setting • Aim is to facilitate group communication and productivity,	• focuses on what is being communicated • is used in the educational setting • Aim is to scaffold or support students in learning together effectively

In CSCL the interactions among the students are monitored and controlled by a collaborative learning system. The Collaborating System is connected to the workstations from which students would interact. A collaborative learning system focuses on refining and integrating the learning process and the subject knowledge of the students with the help of the collaborative partners. With CSCL, the student can discuss a topic with a group of students who criticize, motivate, advise and direct the student towards a better understanding of the subject matter.

Since CSCL has a focus on social aspects and the use of collaboration technology in relation to education and learning, then it can be used to provide support for improved communication, to provide support for increased participation and to provide computational support for tasks (Rao & Jarvenpaa, 1991).

Collaborative learning was studied in a classroom-based environment at first. The emergence of CSCL has sparked an increasing interest for research into the role and impact of technologies on group learning. Meanwhile, the literature review of the study by Kedong & Jianhua (2001) pointed out that some issues in collaborative learning were referred to research along with computer technology and World Wide Web (WWW) development and popularization, e.g., CSCL thorough argumentation, ontology perspective for collaborative learning, awareness in CSCL, group support systems, interaction in CSCL, collaborative learning and distance learning and etc.

Since CSCL has a focus on social aspects and the use of collaboration technology in relation to education and learning then CSCL can be used to provide support for improved communication, to provide support for increased participation, and to provide computational support for tasks (Rao & Jarvenpaa, 1991).

The field CSCL has mainly focused on instruction taking place in classrooms and across classrooms, and when children and youngsters constitute the target group of research. Although computer systems have been used to connect students at one site with students at another, research concerned with learning situations where adult students are individually separated by distance, has been limited. This particular focus

has, for several generations, however, been the issues of distance education (Wheeler & Wu, 1996). In the next section these issues will be discussed under the topic of distance education.

2.7 Distance Education

Most definitions of distance education stress the importance of mediated communication (technical support, print media, audio technology) between instructor and students. Distance education is no longer just a distribution of materials. It involves a two-way communication of some forms that are increasing in variety. Distance education will be characterized more and more by active student involvement, quality design, appropriate administrative support, and effective teaching and learning strategies (Laabs 1997, cited in Cannell, 1999).

Developing ICT and especially internet technologies enable support an interactive communication, and collaborative construction of knowledge, and also provide opportunities for distance education on behalf of life long learning. Recently, the terms online distance education or simply online education are widely used.

Despite the long history of distance education, the field of distance education is still emerging. The form of an instructional paradigm is inevitably shifting to some form of a learning paradigm by the complex issues affecting the future of distance education. The advent of ICT and Internet technologies have revolutionized the distance education with the new forms of "web-based learning", "online learning", "distributed learning" or "e-learning".

Chris Dede (1996b), suggests that distance education in all its various terms is shifting to a new model called distributed learning which he describes as "the use of information technologies outside the school setting to enhance classroom activities" (Dede 1997a, 13; Dede 1997b, cited in Cannell, 1999). Distributed learning is a type

of distance learning that is defined as technology-enabled (i.e. computer) and delivered anytime and anywhere. E-learning is defined as the use of computer and Internet technology to manage the delivery of training and education to employees and students – wherever they are and whenever they need it. Web-based learning is the distance education of the future. It allows everyone to have access to information that was not easily available before the Internet.

Internet is used to support collaboration with others both in and outside the class. Collaboration and collaborative learning, limited to generally classroom- based face to face environments in the past, is now enriched through computer-mediated communication. Access to such environments not only enables new ways of working and learning but also enhances collaborative learning by providing new opportunities for organizing collaboratively approached learning methods in distance education.

Modern information technology has revolutionized distance education and is now capable of delivering materials, including the courses for university degrees, anywhere in the world.

New research on online education and especially educational issues in online education can play an important role in helping online education find a more solid place in the landscape of higher education.

From a historical perspective, research on the efficiency of distance education has mainly dwelled on learner attainment, media technologies and the effectiveness of the costs. There is an abundance of studies which compared the effectiveness of a conventional classroom to an online classroom in terms of learner achievement. Most of such studies concluded that there was no significant difference between traditional education and distance education. (Simonson,M, et.al, 2000; Russel 1999; Moore & Kearsley, 1996, all cited in Chang, 2002).

Recently, online distance education has become attractive for higher education institutions with the flexibility, convenience and the certain profitability of offering

courses to the masses via the Internet. These developments will also open new horizons for those who are isolated by disabilities. The predicted eventual goal of distance education programs at higher education institutions would be to offer complete online degrees with the utilization of asynchronous and synchronous web-based technologies.

Distance education courses will not be successful if modified only slightly from traditional courses. Faculty will need training, support services, technology, and a team approach to changing curriculum and learning new delivery methods. Students will need new skills, appropriate orientation, and support services to successfully complete distance education courses. Institutions will need to provide administrative support and have additional resources available.

The effectiveness of online learning will only be realized if distance technologies are selected and used appropriately. (Chen, 1997). Opportunities for distance and global learning will increase and the wider use of skilled specialist teacher resources in interactive distance learning will develop steadily. Experimentation and research is necessary for successful distance education programs in schools and universities.

CHAPTER 3

RESEARCH PROBLEMS

The main purpose of this study is to explore and investigate both the students' and instructor's perceptions about learner benefits, learner support, motivation, computer mediated communication (CMC), and group work in the online learning environment offered in a web-based course.

Another purpose of the study is to explore the factors that contribute to collaboration via CMC in a web-based course.

3.1 Problems

In the light of the purposes stated above, this study focused on the following sub-problems:

P1 How do the students perceive the impact of the online learning environment in terms of their benefits, supplied support, motivation, CMC, and group work?

- P1.1 How do the students perceive their benefits in the course?
- P1.2 How do the students perceive the motivational factor in the course?
- P1.3 How do the students perceive learner support in the course?
- P1.4 How do the students perceive supplied CMC?
- P1.5 How do the students perceive facilitated group work in the course?

P2 How does the instructor perceive the potential of the online learning environment in providing learner benefits, learner support, motivation, computer-mediated communication, and group work?

P2.1 How does the instructor perceive providing learner benefits?

P2.2 How does the instructor perceive providing motivation?

P2.3 How does the instructor perceive providing learner support?

P2.4 How does the instructor perceive the supplying CMC?

P2.5 How does the instructor perceive the facilitating group work?

P3 What are the factors that contribute to collaboration via CMC in a web-based course?

CHAPTER 4

METHODOLOGY

In this chapter the methodologies utilized in this study will be provided in detail. First the research design and procedures, then the description of the participants in the study are provided. The next item presented in this chapter is the description of the online course as the context (learning environment). Data collection instruments and the procedures and the data analysis are also explained in the present chapter. Finally, assumptions and the limitations of the study are presented.

4.1 Overall Design and Rationale

This research study was designed to explore the perceptions of the participants regarding learner benefits, learner support, motivation, computer mediated communication, and group work in the online learning environment purposefully selected as a web-based course offered for three successive semesters. The study also examined the factors contributing to collaboration via CMC in a web-based course. This study obtained relevant data from the participants through the Online Collaborative Learning Evaluation Questionnaire, the analysis of online learning environment, and informal interviews with the instructor in order to supply the quality data needed for the data analysis section of the study.

The study is a mixed methods case study based upon non-experimental design and a follow-up case-based qualitative study.

Educational research studies have generated different research methods offering different benefits and drawbacks. Traditionally, literature on social science research methods favors studies that use combined methodologies. Mingers (2001) stated two main reasons for combining methods in a single research. First, a variety of research methods is needed to address and understand the different aspects of the world. Second, the researcher needs different methods to help develop richer and more reliable results. The importing thing here is to balance the best methods to apply to questions and problems.

This study used a combination of components normally found in a descriptive, case study and qualitative research. While the purpose can be the same for both descriptive and qualitative research, a mixed methods case study design will enable the researcher to explore beyond the limitations of simple questioning.

In this case study, descriptive statistics of data, content analysis of informal interview data, and context analysis of the learning environment were conducted. The combination of descriptive, case study and qualitative research methodologies were utilized in order to gain a rich understanding of the collaborative learning that occur in an online learning environment in which group projects were conducted via CMC.

Descriptive research is defined as "a type of quantitative research focused on providing an accurate description or picture of the status or characteristics of a situation or phenomenon" (Johnson & Christensen, 2000, p.302). Most of the research projects in education made use of descriptive methods of analysis rather than experimental research. Educators use descriptive research to examine behaviors, attitudes, opinions, demographics and beliefs of subjects (Yıldırım, 2000, Gürbüz, et al, 2001). In descriptive research design details of a social situation or relationships are presented by describing the existing variables and sometimes by describing the possible relationships between these variables. Descriptive family of research supplies the purpose of indicating the "what is", "what are" questions or curiosities no matter whether the form of the "answer" is qualitative or quantitative. This concept fits well the purpose of the proposed research.

Therefore, this study included descriptive research methodologies in that a questionnaire was used as an entry point for data collection. The study examined the responses of the students to the questionnaire given at the end of the semester in order to investigate students' perceptions about the effect of the online learning environment in terms of learner benefits, learner support, motivation, computer mediated communication, and group work. It was intended to provide a clear picture of how the participants perceived the effect and potential of the online learning environment in a web based course through a quantitative method using a large sample.

A case study is defined as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident" (Yin, 1994, p.13). The case study research is a method of conducting qualitative research, in which multiple sources of evidence are used. It evolved as a distinctive approach to empirical inquiry, partly as a reaction to perceived limitations of quantitative research (Gall, et al. 1996).

As collaborative learning via CMC in online learning environments is a relatively new phenomenon, this case study provides data for meaningful facilitation of web-based learning in education. Since the research problems involve the exploration of the perceptions about the impact and potential of the online learning environment in a web-based course, a case study was included as the most effective method of inquiry to frame this research study for profound exploratory purposes. The exploration focused on the perceptions of students and the instructor who attended the Web course offered during three successive semesters.

Qualitative research can be defined as "research devoted to developing an understanding of human systems" (Savenye & Robinson, 1996, p. 1172). It was described by Fraenkel and Wallen (2003) as an approach that a researcher would use to "obtain a more holistic feeling of learning and teaching" contrary to a quantitative approach (p. 430). Qualitative research is considered to help find out, through rich description, "to what extent and how well something is done" (p. 430). Qualitative

family of research was seen as involving the study of language, communication, and experiences by Gall et al. (1996). According to Leedy &Ormrod (2001) qualitative research methods enable the researcher to explore the complex issues in detail through the collection and analysis of qualitative data.

Since the present study intended to develop a better understanding of the effect and potential of the online learning environment in a web based course, it employed qualitative methods in order to supply a comprehensive analysis of the online learning environment in depth. Informal interviews were conducted with the instructor to find out the instructor's perceptions about the potential of the learning environment in providing learner benefits, learner support, motivation, computer mediated communication, and group work.

4.2 Sample Selection and Participants

This study employed the sample selection methodology based upon purposive strategies in particular, convenience and criterion sampling technique to select the participants.

Purposive sampling is defined as "a procedure by which researchers select a subject or subjects based on predetermined criteria about the extent to which the selected subjects could contribute to the research study" (Vaughn, et al., 1996, p. 58). Most qualitative studies employ purposeful (or purposive) sampling, selecting a sample consciously based on researcher's established particular criteria. Hence, purposeful sampling is considered to be the dominant strategy in qualitative research. Patton (1990), states that "the power and the logic of purposeful sampling lie in selecting information-rich cases for study in depth where information-rich cases are those from which one can learn a great deal about issues of central importance to the purpose of the research" (p. 169). Patton identifies and describes 16 types of purposeful sampling, including deviant or extreme case sampling, maximum variation sampling, typical case sampling, snowball or chain sampling, confirming or

disconfirming case sampling, politically important case sampling, convenience sampling, criterion sampling, and others (Patton, 1990, pp. 169-183).

Convenience sampling is considered as one of the most commonly used sampling strategies where the selection of participants is based on easy accessibility and/or availability for the researcher and, for their knowledge of the subject matter.

Criterion sampling strategy is commonly used in qualitative research where the cases that meet some predetermined criteria are studied. Patton (1990), Marshall and Rossman (1999) stated that criterion sampling can help strengthen the quality of a research study by adding significant qualitative components and ensuring more accurate in-depth analysis.

The key concepts intended to be explored in this research study are the processes of collaborative learning via CMC that occur in an online learning environment in which small group projects were conducted by undergraduate students. Guided by the principles for sample selection discussed above, the researcher decided on the criteria about the extent to which the selected participants could contribute to the object of this research study. The predetermined criterion in this study was an undergraduate course that required a collaborative group project in which CMC was used as the online communication component to facilitate group dialogues.

The online course "CSIT444-Online Web Design" offered by the Institute of Distance Education of East Mediterranean University was found to meet the purpose of this research. This course was an undergraduate course in which the professor required students to undertake an extensive collaborative project in an online learning environment supported by CMC. This course was selected because of the quality of the academic program, the accessibility to the data, and because of the willingness of the course instructor to participate. This course was selected to conduct the study also because of its objective to teach Web page design; hence the students would be computer literate enough to use CMC tools. The study examined the same course for three successive semesters to investigate the impact/potential of

the online learning environment in terms of learner benefits, supplied support, motivation, computer-mediated communication, and group work. The online learning environment offered in this course was qualified as good practices for collaborative distance learning via CMC and that was selected as information-rich case.

Therefore, the methodology used to select the participants in this study was purposive strategies, in particular; convenience and criterion sampling.

The participants of this study were the course instructor and the total number of vocational education last year students at the School of Computing & Technology of East Mediterranean University (EMU). They participated in the web-based course "CSIT444-Online Web Design" during the fall and spring semester of 2002 and the fall semester of 2003 consecutively.

The students were not selected and they did not know that they were going to take part in this study when they were enrolled to the course at the beginning of the term

Instructor was a professor in the Department of Computer Education and Instructional Technology of the Middle East Technical University located in Ankara and carrying out the classes for the course CSIT 444 as online for the students at EMU. The online course CSIT444 was developed completely by the instructor. This course was a two year effort in the initiation of the distance education course in CEIT-METU where he had been giving lectures for several years. The instructor Prof. Dr. M. Yaşar Özden had many experiences with using information technology in his courses and teaching partially online before teaching a complete online course. He had undertaken many instructional technology and distance education related projects. He was willing to have his students participate in this study and he was also a participant as an interviewee.

In this study data were collected from the instructor and 209 students attended classes for three successive semesters. The number of students enrolled for the

course was 100 in spring 2002, 54 in 2004 and 55 in fall semester of 2003. The course enrollment data for each semester is shown in Table 4.1.

Table 4.1. Course CSIT 444 Student Enrollment Data.

	Semester			Total
	Fall 2002	**Spring 2002**	**Fall 2003**	
Female	44	15	22	81
Male	56	39	33	128
Total	100	54	55	209

The students were taking this course as an elective for the completion of their degree programs. All the students were already familiar with the CMC system and were computer literate enough to take a web-based course before the study conducted. Therefore, no special training was scheduled to introduce the participants to the system. The participants were having their first online collaborative learning experience through this web-based course and they were told that their participation was voluntary and their responses to the questionnaire were confidential.

4.3 Context – educational setting

The study was conducted in an actual field setting. A detailed documentation of the case was given in this section as suggested by Merriam (1998). In this study, the researcher described the learning environment in detail in the light of the informal interviews held with the course instructor.

The course selected for this study was the web-based course "CSIT444-Online Web Design" offered by the Distance Education Institute of East Mediterranean University (EMU). This course was designed and developed by the instructor especially to provide necessary background knowledge through the Internet in both asynchronous and synchronous mode for the students who intended to learn web

page design. The main objective of the course was to teach students Web design. The topics included in the course description are: Introduction to Computers & Internet; Introduction to Internet Explorer 5 and the World Wide Web; Introduction to HyperText Markup Language 4 (HTML 4); Intermediate HTML 4; Paint Shop Pro; Microsoft FrontPage Express; JavaScript/JScript: Introduction to Scripting; Dynamic HTML: Cascading Style Sheets (CSS); Multimedia: Audio, Video, Speech Synthesis & Recognition; Web Servers (PWS, IIS, Apache, Jigsaw); Database: SQL, ADO and RDS; Active Server Pages.

In order to meet the course objectives the instructor employed the following course strategies:

Peer to peer collaboration: The students were encouraged to collaborate with online discussions, forum and chats.

Instructor feedback: The instructor spent time answering the messages that come to the forum and chat in time so that the students would not be confused.

Grader feedback: The evaluation criteria that the instructor used while grading students' works and projects were presented to students on the web.

Student-centered learning: The course was based on student centered learning where the students chose the way they learned and had more freedom in this respect compared to traditional courses. Instructor's roles were a facilitator and a guide.

Authentic learning: The course was based on realistic scenarios as reflected by the group projects.

Critical thinking: The students were encouraged to generate original ideas and use their critical thinking skills to develop appealing web pages.

Project based learning: The students developed a plan to apply their project in a real life context.

Problem-based learning: The students dealt with a real problem and they tried to find solutions to the problem throughout their project.

The technical infrastructure including the operational system, the software, and the technology that would support the course effectively on the web was chosen carefully by the instructor regarding the interactions of student/student and student/instructor in the internet environment. Thus the following software and services were installed

through windows 2000 by taking its widespread use into consideration: Windows 2000 Advanced Server, WEB Server, Exchange 2000 Enterprise Server, Exchange 2000 Communication Server, Site Server ILS Services, Windows Media Services, Snitz Forums 2000 Version 3.1 Service Release 4. The materials to be used in the lessons were developed as compatible with this infrastructure.

This course was designed according to the requirements for online course offering declared by the National Institute of Informatics of Higher education Council in Turkey. An independent web site was constructed to present the course syllabus, study guides, resources, announcements, and assignments etc. The interface for this site was designed in an appropriate user-friendly form with a menu bar to meet the students' needs (see Figure 4.1). This menu bar contains the short-cut icons of chat, forum and e-mail in order to provide opportunities for communication and collaboration. Other items were placed in the menu bar with a link to present course syllabus, study guides, resources, announcements, assignments, and frequently asked questions contained on the course site.

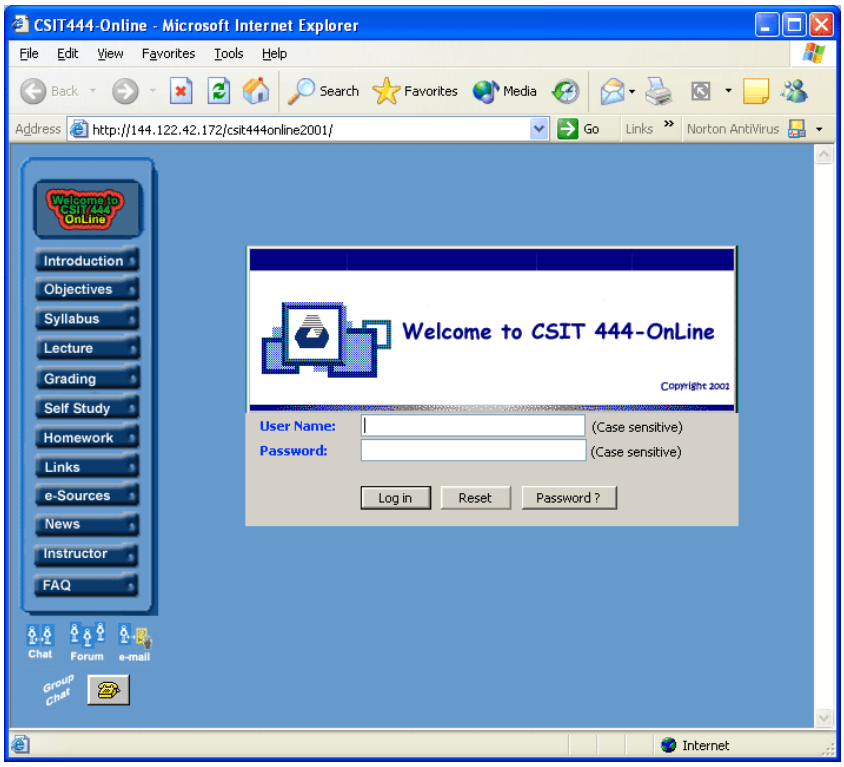

Figure 4.1. The Welcome Page of the Course Web Site

Lecture notes were supplied on the site in the form of PowerPoint slides (see Figure 4.2). The assignments were regularly announced every week and they were submitted via e-mails and the evaluation results were announced on the course web-site (see Figure 4.3). The pages were designed as ASP in order to follow the students' moves from the moment they entered the site and each click were recorded in the data base.

The class meeting sessions were scheduled weekly for two hours through the online learning environment (see Figure 4.4). The groups of students participated in the chat sessions on Thursdays and Fridays throughout the term. Students were asked to read their lecture notes before the chat sessions and the questions on the topic of the week were answered during the sessions.

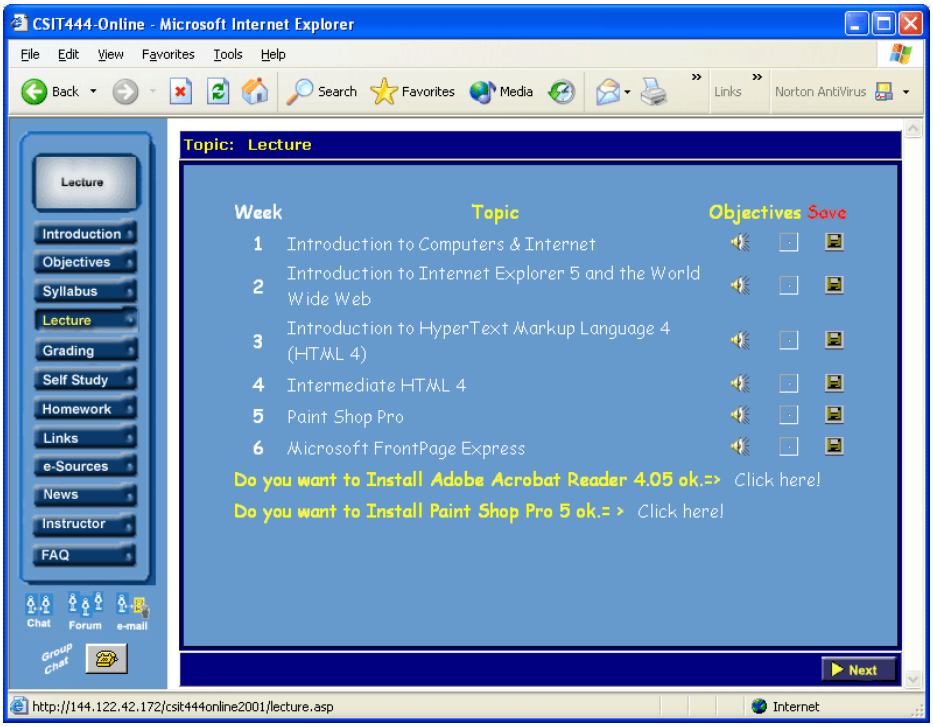

Figure 4.2. The Lecture Notes Page of the Course Web Site

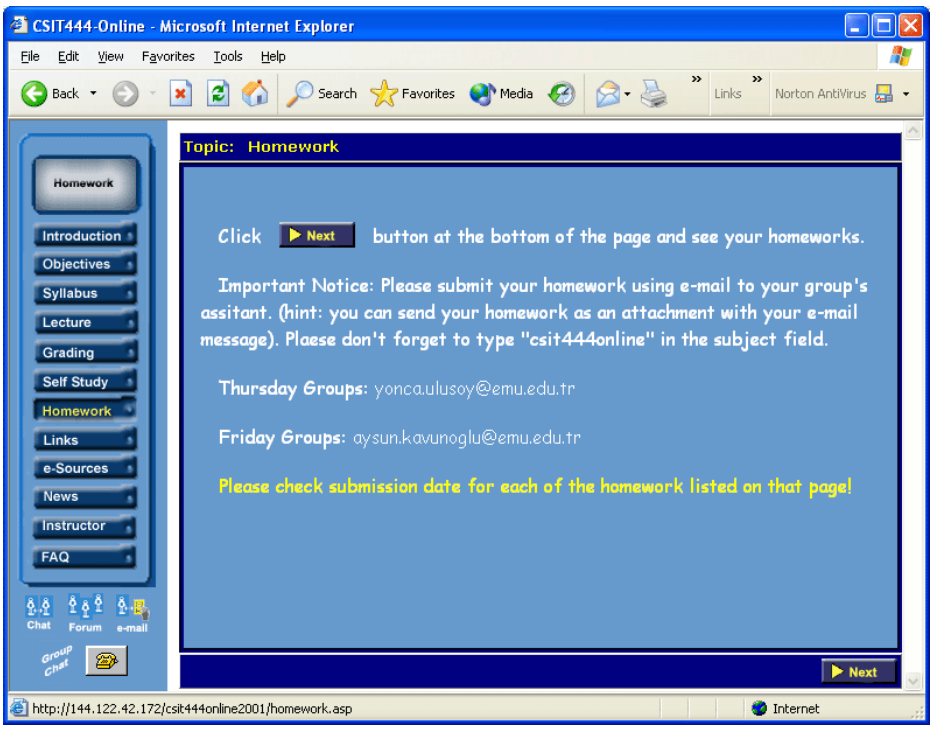

Figure 4.3. The Homework Page of the Course Web Site

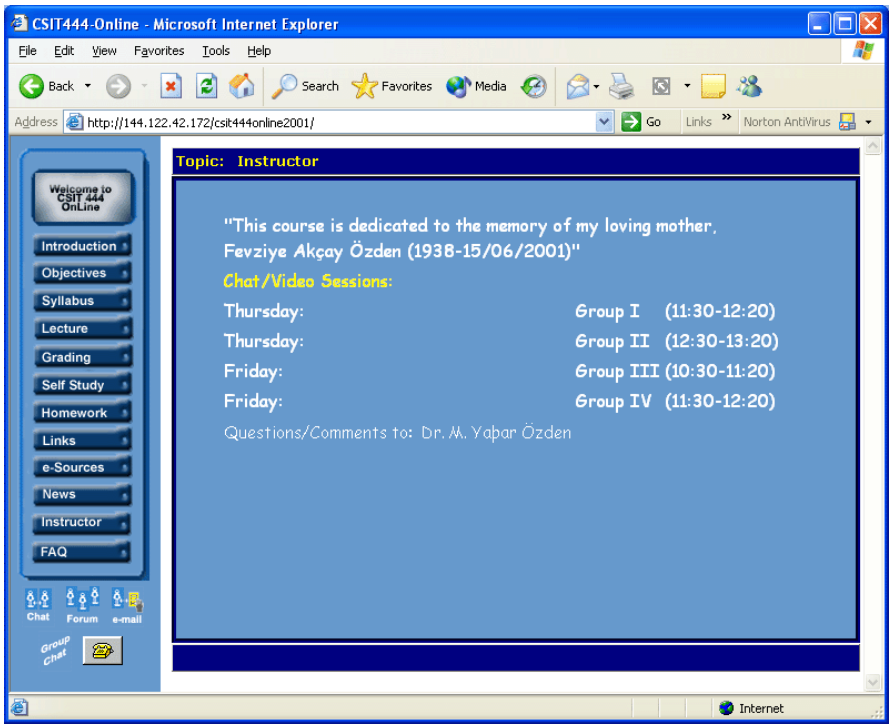

Figure 4.4. The Class Meeting Sessions Homework Page of the Course Web Site

The instructor was at a distance and the students were gathered in one location in this course, unlike many other distance education courses where the students were in distributed locations, and the course dynamic was different. Although the students were on the same campus every day, worked together in person, and socialized with each other face-to face, the Internet was the only common place where the whole class, including the instructor, got together. The communication was indeed between two cities, unlike most education courses in which the communication among teachers and students occur up to dozens of cities. The condition of the physical separation between the instructor and the students greatly heightened the need for the online education environment to be friendly and appropriate so that class interactions could be effective, and easy to initiate and participate in. Prescribing the course content, managing student information, providing technological infrastructure, technical problem-solving, supervising student communication, facilitating student collaboration, administrating student assessment as well as monitoring student evaluation were all done by the instructor. Technical support for the course offering was provided both by the instructor and the Distance Education Institute of EMU.

4.4 Variables

The independent variable for the first research problem (P1) is the effect of the online learning environment.

Dependent variables for P1 are:

Students' perceptions of the effect of the online learning environment in terms of

- their benefits,
- supplied support
- motivation,
- computer-mediated communication,
- group work

The independent variable for the second research problem (P2) is the impact of the online learning environment.

Dependent variables for P2 are:

Instructor's perception of the impact of the online learning environment in terms of

- learner benefits,
- learner support
- motivation,
- supplying computer-mediated communication,
- facilitating group work

4.5 Instruments

This section will provide detailed information about the instruments and data sources used for data collection. For this case study, data was gathered through Online Collaborative Learning Evaluation Questionnaire (OCLEQ), the analysis of online learning environment, and informal interviews with the instructor. This section will also discuss the researcher as an instrument for data collection.

4.5.1 Online Collaborative Learning Evaluation Questionnaire (OCLEQ)

This study utilized the survey instrument called Online Collaborative Learning Evaluation Questionnaire (OCLEQ) to obtain relevant data from the students about their perceptions of the impact of the online learning environment in terms of their benefits, supplied support, motivation, computer-mediated communication, and group work. The OCLEQ is an online 28 item Likert-type questionnaire with a single open-ended question asking for students to type their possible additional comments on the course web site (see Appendix A).

Questionnaires are recommended as effective tools by Johnson and Christensen, (2000) to measure perceptions and values in research studies. Dillman, (2000) stated that electronic surveys provide efficiencies and amenities for the design, implementation and completion of self-administered questionnaires such as elimination of data entry errors, and removal of paper, postage and costs. Moreover, Gliner and Morgan, (2000) suggested that the Likert-type scale is used when attitude, opinion, and perception are being measured since it is more agreeable to the quantitative approach. McMillan, J.H., Schumacher, S. (2001) stated that Likert scale is the most common example of scaled items used in the questionnaires. "A true Likert scale is one in which the stem includes a value or direction and the respondent indicates agreement or disagreement with the statement" (p.262). The scale usually based on a five-point or seven-point scale.

The OCLEQ included a five-point Likert- type scale consisting of 28 items. Each item anchored from 1 to 5, where 1 indicates strong disagreement and 5 indicates strong agreement. The students could select a rating from strongly disagree, disagree, neutral, agree, and strongly agree.

The OCLEQ was selected as the survey instrument because it captured student perceptions about the effect of the online learning environment in providing benefits, support, motivation, computer mediated communication, and group work. This questionnaire was also selected and used by taking into consideration the validity and internal consistency of the instrument.

This instrument was a previously developed and validated questionnaire. It was the instructor who developed the questionnaire by making use of the related internet sources. The questionnaire was used in different studies several times. Koç(2002) obtained the reliability measure of the overall questionnaire as 0.9, and Ersoy(2003) found the same coefficient as 0.92 in their study.

In this study, a statistical test of the reliability coefficient Cronbach Alpha indicated that OCLEQ had an internal reliability of 0.92 (see appendix 1 reliability analysis), thus indicating a high level of internal consistency.

The items of the questionnaire were grouped in 5 factors (sub-scales) in the previous studies as: Student perceptions about

- learner benefits,
- learner support
- motivation,
- computer-mediated communication,
- group work

A factor analysis was conducted to collect evidence for approving these factors to determine which items were grouped. Several methods are available for computing factor analysis. The Principal Component method was applied iteratively and Varimax rotation was used to facilitate the interpretation of the results. The factor analysis indicated that 56% of variance was accounted for, suggesting that the variability of scores in the dependent variable was accounted for by the factors (see appendix 2 factor analysis).

When the factor analysis results were examined it was seen that some of the questions were found to be proper for the obtained factors and some were not. It is assumed that this inconsistency was caused by the sample size for the factor analysis. For an effective factor analysis at least 10 participants are required for each item, that means 280 participants are necessary for a 28 item questionnaire. As a result, the questionnaire preserved the same sub-scales (clusters) as perceived benefits, motivation, learner support, CMC, and group work. All scaled variables were tested for reliability using a Cronbach's Alpha of 0.5 as the criterion.

The reliability coefficients and number of items for each sub-scale are demonstrated in Table 4.2.

Table 4.2. Reliability coefficients for OCLEQ Sub-scales

Sub-scales	Number of items	Alpha coefficient
Learner benefits	8	0.85
Motivation	4	0.70
Learner Support	4	0.46
CMC	6	0.75
Group Work	6	0.56
Total	28	0.92

The questions used in the OCLEQ to gather information about students' perceptions fell in the following categories: CMC, group work, students' benefits, motivation, and learner support. The questions that related to CMC were 2, 3, 22, 23, 24, and 25; group work, 9, 11, 16, 17, 18, and 19; students' benefits, 12, 13, 14, 15, 20, 21, 26, and 28; motivation, 6, 7, 8, and 10; and learner support, 1, 4, 5, and 27.

The 19th item in the questionnaire was negatively worded, but the variable used for the statistical analysis was the reverse of the number chosen by the respondent. The reverse score was obtained by subtracting the actual response from six.

The OCLEQ also included one open-ended item in order to collect data to reveal the factors that possibly contributed to collaboration via CMC in a web-based course. This item asked students to write their additional comments or opinions in the text box placed at the bottom of the questionnaire.

4.5.2 Analysis of Online Learning Environment

An analysis of the learning environment was planned to capture the essence of the design approach for the online course regarding the potential of the learning environment in providing learner benefits, learner support, motivation, computer-mediated communication, and group work. This analysis also intended to explore the possible factors that contributed to collaboration via CMC in a web-based course.

This study used the instructional design framework provided by Herrington & Oliver (2000) as the criteria for analyzing the online learning environment in the course CSIT 444. This framework which is also named as situated learning framework was produced for the design of authentic learning environments. Herrington & Oliver (1995) stated that useable knowledge is best gained in learning environments which feature the following nine characteristics defined in this framework. Situated learning environments:

- Provide authentic context that reflect the way the knowledge will be used in real-life;
- Provide authentic activities;
- Provide access to expert performances and the modelling of processes;
- Provide multiple roles and perspectives;
- Support collaborative construction of knowledge;
- Provide coaching and scaffolding at critical times;
- Promote reflection to enable abstractions to be formed;
- Promote articulation to enable tacit knowledge to be made explicit;
- Provide for authentic assessment of learning within the tasks.

Course materials and the online learning environment for the web based course CSIT 444 – Online Web Design was analyzed according to above framework.

4.5.3 Informal interviews with the instructor

This study used interviewing in order to gather and record the experiences of the instructor. The interviewing method provides several advantages for case studies because of supplying flexibility and capability to capture a wide range of data. Patton, (1990) explained that "The purpose of interviewing is to find out what is in and on someone else's mind….We interview people to find out from them the things we cannot directly observe" (p. 278).

According to Patton, (1990) there are three basic approaches to interviewing in qualitative studies: (1) the informal conversational interview, (2) the general interview guide approach, and (3) the standardized open-ended interview. The first approach, the informal conversational interview, was described as a natural conversation with no apparent structure or predetermined course.

This case study utilized the informal conversational interview approach. Some of the questions in the interviews were predetermined but follow-up and probing questions were also used to explore the responses. As for the interview guides, the researcher did not see any advantage of using them. Interview guides are used in order to assist the researcher in asking the same questions the same way for each participant. In this study, however, there was only one person to be interviewed and thus no need to use an interview guide.

The interview approach used in this study was similar to the process defined for the informal interview by Patton, (1990). This approach was selected to provide comprehensive, rich and detailed data from the instructor's perspective. It is important to obtain essential information to examine and discover what the instructor provides in an online learning environment for the student needs and expectations. Informal interviews created opportunities for the researcher to gain valuable data about the online learning environment.

In this study several informal interviews were conducted to capture the instructor's perception about the potential of the learning environment in providing learner benefits, learner support, motivation, computer mediated communication, and group work. The interview notes were gathered by asking the instructor questions on the following points: course design approach, development and implementation of the course, level of interactivity and interaction experienced, strategies used to motivate students, the support structure of the course, breadth of support and resources, the amount of effort and time spent for carrying out the online classes, areas of difficulty as reported by the students, the factors contributing to collaboration via CMC, strengths and weaknesses of the course, and role of the instructor.

4.5.4 The researcher as an instrument for data collection

In qualitative research the methods of data collection are focused generally on using the researcher as an instrument to gather information through observations, artifact analysis, and interviews (Nolan, 2000). The purpose of gathering information should be contributing to the detailed descriptions generated by the other data sources.

The researcher as an instrument indicates the significant role the researcher plays in identifying, interpreting and analyzing the environment in the study (Siegel, 1998). In this study the researcher, in fact, tried to find out what it is like to be a member of the course in order to analyze both the impact and the potential of the online learning environment.

In qualitative research, the researcher is part of the research design. The reliability of the results is in part dependent on the effectiveness of the researcher.

4.6 Data collection Procedures

In this section the details of the procedures for data collection used in this study will be discussed.

The research study collected data during the fall and spring semester of 2002 and the fall semester of 2003 consecutively to ensure ample data for study in depth. The relevant data from the participants was collected through the Online Collaborative Learning Evaluation Questionnaire (OCLEQ), the analysis of online learning environment, and informal interviews with the instructor in order to supply the quality data needed for the data analysis section of the study.

This study collected both qualitative and quantitative data. The research study relied on the participants' responses as the data derived from the Online Collaborative Learning Evaluation Questionnaire, online learning environment analysis, and informal interview notes.

4.6.1 Quantitative Data

Quantitative data was collected through 28 five-point Likert–type items in the OCLEQ to match the first research problem of the study. The OCLEQ was administered at the end of each semester as online in an interactive electronic form on the course web site to collect relevant data for the study.

Students were required to answer all the questions in the questionnaire. The Likert–type questions were grouped by 5 categories concerning student perceptions of their benefits, supplied support, motivation, computer-mediated communication, and group work (see appendix D for these question groups).

Students were informed that their participation was voluntary and their responses to the questionnaire were confidential. All students were requested and encouraged to complete the online questionnaire. They were given one week at the end of each semester to complete the questionnaire and all of the 209 students enrolled to the course for three semesters submitted their responses.

The responses were automatically recorded for each semester in MsAccess databases digitally. A coding guide was used during the data collection (see Appendix E). All the collected data in databases were then examined for blank responses. Although 209 students returned the questionnaire, data were collected from 175 (84 %) students as 34 of the students did not answer all the questions, thus were left out from the data. After data cleaning all the data were

combined in a single MsExcel file, and then imported into the SPSS 10.0 for Windows software program for statistical analysis.

4.6.2 Qualitative Data

Qualitative data was collected through the informal interviews with the instructor, analysis of the learning environment and through the single open-ended item contained in the questionnaire to match the second and the third research problem of the study.

Informal interviews were arranged with the instructor at convenient times and guided questions were used during each interview. The output from the informal interviews with the instructor included the transcription of the interviews, notes taken during the interviews by the researcher and observation during the interviews and class sessions at the instructor's office. Informal interview notes and the transcriptions consisted of the experiences, thoughts, beliefs and perceptions of the instructor as he discussed his online teaching experience. These outputs were the primary raw data used in the analysis to capture the instructor's perception about the potential of the learning environment in providing learner benefits, learner support, motivation, computer mediated communication, and group work. Informal interviews created opportunities for the researcher to gain valuable data both about the online learning environment and the possible factors that contributed to online collaboration through CMC.

The online learning environment was described and evaluated by the researcher's notes in terms of course design, development and implementation. The instructional design framework provided by Herrington & Oliver (2000) was used as the criteria for the evaluation. Course materials, course web site, collaboration opportunities, and support structures offered in the course were examined regarding the design approach for the online course. Data were collected for this purpose during the informal interviews with the instructor and from the student responses to the open-ended item in the questionnaire.

The open-ended item in the questionnaire asked students to write their additional comments on the web-based course in order to collect supportive data about the potential of the learning environment and the factors that possibly contributed to collaboration. Of the 175 students, 129 answered the open-ended item in the questionnaire. The student responses to the open-ended question were compiled and analyzed to identify any themes. Finally, the research questions were than answered based on the interpretation of the results of the study. Table 4.3 illustrates each research problem and the corresponding data collection methodology used to get the relevant response.

Table 4.3. Research Problems and Method of Data Collection

RESEARCH PROBLEMS	DATA COLECTION
P1: How do the students perceive the impact of the online learning environment in terms of their benefits, supplied support, motivation, computer-mediated communication, and group work?	The Online Collaborative Learning Evaluation Questionnaire
P2: How does the instructor perceive the potential of the online learning environment in providing learner benefits, learner support, motivation, computer-mediated communication, and group work?	Informal Interviews with the instructor the analysis of online learning environment
P3: What are the factors that contributed to collaboration via CMC in a web-based course?	Open ended question in The Online Collaborative Learning Evaluation Questionnaire Informal Interviews with the instructor the analysis of online learning environment

4.7 Data Analysis

In this section the details of the methods that were used for data analysis used in this study will be discussed. Several statistical methods and qualitative methods were used to examine the collected data.

This research study examined whether the online learning environment was perceived both by students and the instructor as providing a meaningful collaborative learning experience via CMC, whether the resources were sufficient, and whether there were other factors that contributed to collaboration via CMC in a web-based course. The mixed methods case study design was employed since a quantitative or qualitative research approach alone may not have been sufficient to reach the objectives of the study. Therefore, the mixed methods case study design of the present study allowed the researcher to analyze the perceptual student responses from the OCLEQ quantitatively and to incorporate qualitative informal interview responses from the instructor. In addition, the analysis of the online learning environment was conducted.

Descriptive statistics were run to analyze the collected data for the first research problem. For the second and third research problems data were analyzed by means of qualitative analysis processes.

The responses to the questionnaire were analyzed using the SPSS 10.0 for Windows software program. Charts and tables were created from the data using SPSS features. Questions 1 through 28 listed as COLQ1, COLQ2,… and all the collected data were coded with the help of Data Coding Guide. Then the researcher analyzed the 28 questions and calculated mean, frequency, percentage, and standard deviations for each question.

The responses to the open-ended item were evaluated to find out the themes related to the impact of the learning environment in terms of collaborative processes and the factors that possibly contributed to collaboration.

The learning environment was evaluated and analyzed by the researcher in terms of course design, development and implementation and this evaluation was based on the criteria determined for data collection. The notes taken by the researcher during the informal interviews with the instructor and the student responses to the open-ended question in the questionnaire were all used for the evaluation.

The data collected from the interviews were analyzed using the stages provided by Herrington & Oliver (2000) which are based on a three step process proposed by Miles and Huberman (1994) as data reduction, data display, and conclusion drawing and verification. The stages of the data analysis for this case study are summarized in Table 4.4

Table 4.4. Stages of data analysis for the study

Method of Analysis	Stages	Description of the process used
Quantitative	Coding	Data from the OCLEQ were coded with the help of Data Coding Guide (see Appendix).
	Descriptive statistics	Descriptive analysis of mean, frequency, percentage, and standard deviations for each question were calculated by using SPSS 10.0 for Windows software program.
	Display	Charts and tables were created from the data using SPSS features.
	Conclusion Drawing	Interpretations were made on the tables and charts developed and then conclusions were drawn.
Qualitative	Coding	Data from the informal interview notes and responses to the open-ended item were coded into categories in terms of their relevance determined by the research problems. Files were developed in MsWord for subsequent analysis.
	Ordering and Displaying	Patterns and themes were determined, and Data was organized into displays.
	Conclusion Drawing	Decisions about the meaning of data were made and conclusions were drawn and they were included in the dissertation.
	Verifying	Conclusions were verified by reviewing with reference to the original data.

4.8 Assumptions for the Study

For this study, the following assumptions are made:

1. The participants responded accurately to all the instruments used in this study.
2. The data were accurately recorded and analyzed.
3. Reliability and validity of all the measures used in this study are accurate enough to permit accurate assumptions.

4.9 Limitations of the Study

The following limitations are relevant to the present study:

1. The number of participants is limited.
2. Validity of this study is limited to the reliability of the instruments used in this study.
3. Validity is limited to the honesty of the subjects' responses to the instruments used in this study.
4. This study is limited to students at EMU.
5. The sample size in this study is limited to the students who enrolled in the web-based course CSIT 444.

CHAPTER 5

RESULTS AND CONCLUSIONS

In this chapter, the results of statistical and qualitative analyses are presented and the findings are interpreted to document the conclusions related to both student and instructor perceptions about the impact and the potential of the online learning environment in terms of learner benefits, motivation, learner support, computer mediated communication (CMC), and group work. The results and conclusions are presented with reference to the research problems. This chapter includes the following sections: Results of the Questionnaire Responses, results of the online learning environment analysis, results of informal interviews with the instructor, and conclusions.

5.1 Results of the Questionnaire Responses

The OCLEQ with 28 five-point Likert-type items was utilized as a survey instrument to gather quantitative data for all sub-problems of the first research problem. This questionnaire also included one open-ended question in order to collect qualitative data for the third research problem. The following quantitative and qualitative results were obtained by quantitative and qualitative analyses of the collected data through the OCLEQ.

5.1.1 Quantitative Results

Quantitative data were collected from the students who responded to the 28 Likert–type questions in the questionnaire to match the first research problem.

Research Problem One:

P1 How do the students perceive the impact of the online learning environment in terms of their benefits, supplied support, motivation, computer-mediated communication (CMC), and group work?

To answer this question, descriptive statistics were run to analyze 175 responses to the questionnaire. Although, 209 students returned the questionnaire, the responses of 34 participants were excluded due to lack of information as only some items were completed in the questionnaire.

The questionnaire items were arranged to form a Likert-type scale with a five-point spread as rating from strongly agree (SA), agree (A), neutral (N), disagree (D), and strongly disagree (SD). All 28 items were grouped in 5 factors (sub-scales) concerning student perceptions about a) learner benefits, b) motivation c) learner support d) computer mediated communication (CMC) and e) group work. The questions related to these factors wee in the following way: learner benefits:12, 13, 14, 15, 20, 21, 26, and 28; motivation: 6, 7, 8, and 10; learner support: 1, 4, 5, and 27; CMC: 2, 3, 22, 23, 24, and 25; and group work: 9, 11, 16, 17, 18, and 19.

Research problem one sought to determine the level of students' agreement or disagreement on each of the 28 items that were grouped in the 5 sub-scales listed above.

The detailed statistical results for students' perceptions are shown in Table 5.1. Students' perceptions ranged between 3.99 and 4.30, with an overall mean score

M=4.17 for 28 items. Taking into consideration that 28 items were arranged to form a Likert-type scale with a five-point spread, the resultant overall mean score indicates a quite high agreement.

Table 5.1. Descriptive Statistics of Students' Perceptions on the Questionnaire Items.

Sub-scales	Number of items	Mean	Std. Dev.	Alpha coefficient
Learner Benefits	8	4.28	0.61	0.85
Motivation	4	4.24	0.63	0.70
Learner Support	4	4.30	0.53	0.46
CMC	6	3.99	0.66	0.75
Group Work	6	4.06	0.56	0.56
Overall	28	4.17	0.52	0.92

The statistical results of how students perceived their online learning experience are presented in Table 5.2.

Table 5.2 Comparison of Students' Perceptions on the Questionnaire Items Based on Each Semester

Semester	Sub-scales	Mean	Std. Deviation
Fall 2002	Learner Benefits	4.26	0.63
	Motivation	4.21	0.59
	Learner Support	4.26	0.54
	CMC	3.95	0.63
	Group Work	4.04	0.56
Spring 2002	Learner Benefits	4.46	0.50
	Motivation	4.41	0.54
	Learner Support	4.45	0.35
	CMC	4.16	0.58
	Group Work	4.19	0.53
Fall 2003	Learner Benefits	4.13	0.65
	Motivation	4.14	0.76
	Learner Support	4.20	0.62
	CMC	3.91	0.77
	Group Work	3.99	0.59

As the results indicate there is no change in students' perceptions of their online learning experience in three successive semesters. Students perceived their online course as a positive learning experience in all semesters as it can be seen from the high mean values shown in Table 5.2. With the given results in this table we can conclude that students who took the course CSIT444 in each semester were homogeneous with respect to each other in terms of their perceptions. This implies that throughout the terms, students' perceptions of their online course remained unchanged. Students' comments on several aspects of the course are explained according to the student responses to the open-ended item in the questionnaire. Even in the case of some technical problems students still thought that they gained a lot from this learning experience. The qualitative results of the questionnaire will be explained in the next section.

In order to clarify the results supported by Table 5.1, the level of students' perceptions is examined in detail for each 5 sub-scales as follows:

Learner Benefits

The 8 items (12, 13, 14, 15, 20, 21, 26, and 28) grouped in this category were used to match the first sub-problem of the first research problem.

Sub-Problem One:

P1.1 How do the students perceive their benefits in the course?

To answer this question, and determine the level of students' perceptions on each item of the sub-scale "Learner Benefits", descriptive statistics were used. For each item; the means, standard deviations, and the distribution of responses to five-point spread of ratings (SA, A, N, D, SD) are illustrated in Table 5.3.

Table 5.3. Descriptive Statistics of Students' Perceptions on Items Relating to "Learner Benefits".

Item Statement	SA	A	N	D	SD	N=175 Mean	Std. Deviation
Q12 Working as a team made me understand things from different perspectives.	93	51	25	4	2	4.31	0.88
Q13 Learning together was very beneficial to me.	93	59	16	7	0	4.36	0.81
Q14 Working as a team improved my interpersonal skills.	87	57	23	7	1	4.27	0.88
Q15 I understand the subject matter better working with teammates.	94	51	23	5	2	4.31	0.89
Q20 Chats and forums improved my understanding of the topic.	81	56	30	2	6	4.17	0.98
Q21 I was endowed with better skills to create a pleasing web site.	84	72	17	0	2	4.35	0.75
Q26 Working on the project through online communication helped my professional growth.	86	55	30	2	2	4.26	0.86
Q28 Working on the project through online communication socialized me.	88	47	29	10	1	4.21	0.95
Sub-scale Learner Benefits						4.28	0.61

As it can be seen from the table, students' perceptions on each of 8 items indicate high perception levels with high mean scores, where the overall mean score is 4,28 for this sub-scale. This confirms the results illustrated in Table 5.1. The histogram showing the distribution of the responses to the individual items is given in the Figure 5.1.

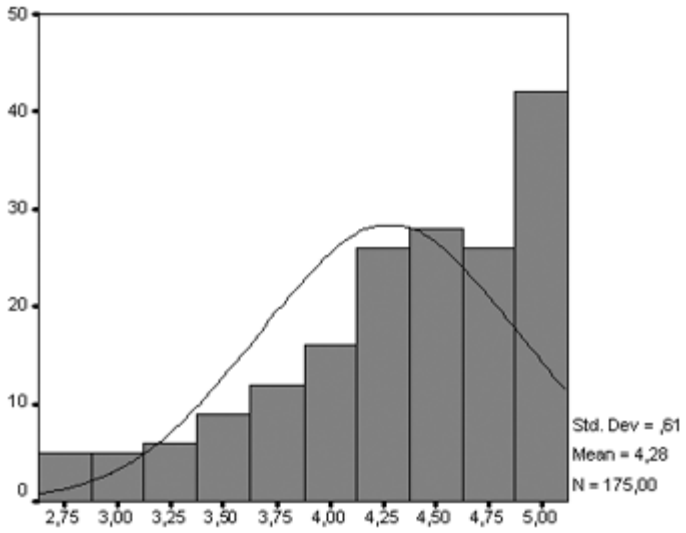

Figure 5.1. Histogram of the Distribution of Responses to Items Relating to "Learner Benefits".

The histogram indicates a left-skewed distribution where the median is greater than the mean value. As supported by the data in the tables and the histogram above, it is indicated that students' perceptions about their benefits from the online learning environment in the web-based course CSIT444 are mostly favorable. The students' responses to the items in the sub-scale "Learner Benefits" indicate their agreement on the benefits presented in Table 5.4.

Table 5.4. Benefits as Perceived by the Students

Item	Agreement (SA+A)		Benefits
	Frequency	Percentage	
Q12	144	82.3	A better understanding of different perspectives by working as a team
Q13	152	86.9	Learning together
Q14	144	82.3	Improvement of the interpersonal skills by working as a team
Q15	145	82,9	A better understanding for the subject matter by working with teammates
Q20	137	78.3	A better understanding of the topics through chats and forums
Q21	156	89.1	Being endowed with better skills to develop a pleasing web site
Q26	141	80.6	Professional growth by working on the term project through online communication
Q28	135	77.1	Socialization by working on the project through online communication

As a result, collaborative working was beneficial for the students in terms of making them understand things from different perspectives; working as a tem improved their interpersonal skills and their understanding of the subject matter; using chat and forum contributed to a better understanding of the topics; they were endowed with better skills to use what they learned to develop a pleasing web site; working on the project through online communication not only helped their professional growth but also their socialization. Learning together was also perceived as a benefit by the students.

Motivation

The 4 items (6, 7, 8, and 10) grouped in this category were used to match the second sub-problem of the first research problem.

Sub-Problem Two:

P1.2 How do the students perceive the motivational factor in the course?

To answer this question, and determine the level of students' perceptions on each item of the sub-scale "Motivation", descriptive statistics were used. For each item; the means, standard deviations, and the distribution of responses to five-point spread of ratings (SA, A, N, D, SD) are illustrated in Table 5.5.

Table 5.5. Descriptive Statistics of Students' Perceptions on Items Relating to "Motivation".

Item Statement	SA	A	N	D	SD	N=175 Mean	Std. Deviation
Q6 The forum and chats increased my motivation towards the subject.	69	69	26	9	2	4.11	0.92
Q7 Working as a team increased my motivation towards the subject.	83	64	21	5	2	4.26	0.86
Q8 The mood of the team encouraged hard work for everybody.	73	67	28	4	3	4.16	0.90
Q10 I enjoyed working with my teammates.	105	52	11	5	2	4.45	0.83
Sub-scale Motivation						4.24	0.63

As it can be seen from the table, students' perceptions on each of the 4 items indicate high perception levels with high mean scores, where the overall mean score is 4,24 for this sub-scale. This confirms the results illustrated in Table 5.1. The histogram showing the distribution of the responses to the individual items is given in the Figure 5.2.

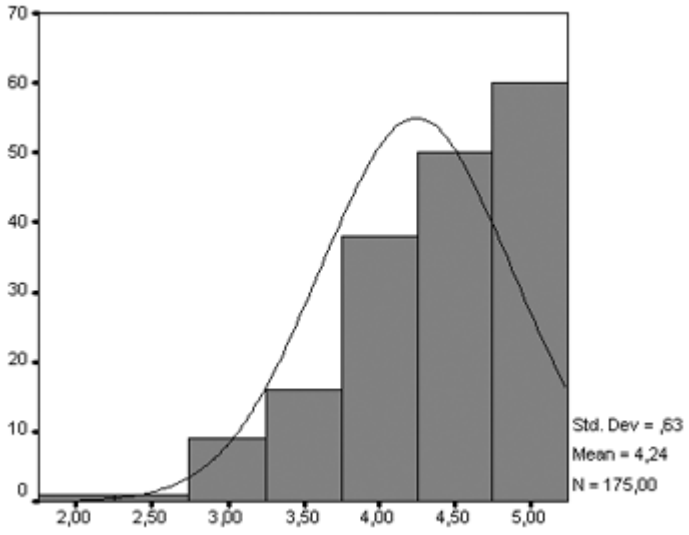

Figure 5.2. Histogram of the Distribution of Responses to Items Relating to "Motivation".

The histogram indicates a left-skewed distribution where the median is greater than the mean value. As supported by data in tables and the histogram above, it is indicated that students' perceptions about the motivational factor in the online learning environment in the web-based course CSIT444 are mostly favorable.

The students' responses to the items in the sub-scale "Motivation" are addressing their agreement on the motivational factors in the course presented in Table 5.6.

Table 5.6. Motivational Factors as Perceived by the Students

Item	Agreement (SA+A)		Motivational Factor
	Frequency	Percentage	
Q6	138	78.8	Using the forum and chats for increasing motivation towards the subject
Q7	147	84.0	Working as a team for increasing motivation towards the subject
Q8	140	82.3	Appreciating the mood of the team for encouraging hard work
Q10	157	89.7	Enjoyment of working with teammates

As a result, working as a team and using the forum and chats increased students' motivation towards the subject; the mood of the team encouraged them to work hard; and they enjoyed working with their teammates.

Learner Support

The 4 items (1, 4, 5, and 27) grouped in this category were used to match the third sub-problem of the first research problem.

Sub-Problem Three:

P1.3 How do the students perceive the learner support in the course?

To answer this question, and determine the level of students' perceptions on each item of the sub-scale "Learner Support", descriptive statistics were used. For each item; the means, standard deviations, and the distribution of responses to five-point spread of ratings (SA, A, N, D, SD) are illustrated in Table 5.7.

Table 5.7. Descriptive Statistics of Students' Perceptions on Items Relating to "Learner Support".

Item Statement	SA	A	N	D	SD	N=175 Mean	Std. Deviation
Q1 The resources in order to search for answers for my questions were adequate.	94	66	13	1	1	4.43	0.71
Q4 I had no difficulties in accessing the web site of the course.	74	58	24	13	6	4.03	1.08
Q5 I was able to receive immediate feedback through chats and forums.	85	65	21	4	0	4.32	0.77
Q27 Flexibility in time made me to work effectively.	96	58	16	4	1	4.39	0.79
Sub-scale Learner Support						4.30	0.53

As it can be seen from the table, students' perceptions on each of 4 items indicate high perception levels with high mean scores, where the overall mean score is 4,30 for this sub-scale, which confirms the results illustrated in Table 5.1. The histogram showing the distribution of the responses to the individual items is given in the Figure 5.3.

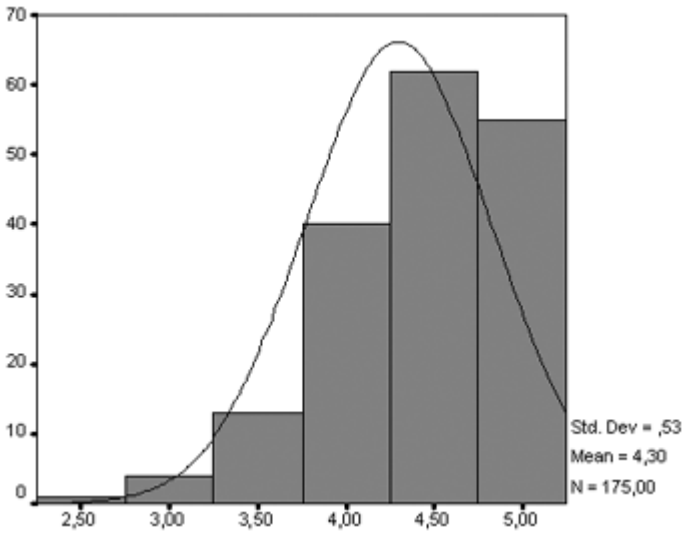

Figure 5.3. Histogram of the Distribution of Responses to Items Relating to "Learner Support".

The histogram indicates a left-skewed distribution where the median is greater than the mean value. As supported by the data in the tables and the histogram above students' perceptions about the support structure of the online learning environment in the web-based course CSIT444 are mostly favorable.

The students' responses to the items in the sub-scale "Learner Support" reveal their agreement on the support structure presented in Table 5.8.

Table 5.8. Support Structure as Perceived by the Students

Item	Agreement (SA+A)		Learner support structure
	Frequency	Percentage	
Q1	160	91.4	Adequate resources in order to search for answers for the questions
Q4	132	75.4	Having no difficulties in accessing the web site of the course
Q5	150	85.7	Being able to receive immediate feedback through chats and forums
Q27	154	88.0	Flexibility of time to work effectively.

As a result, the resources offered in the course were adequate for most of the students in order to search for answers for their questions; they had no difficulties in accessing the web site of the course; they were able to receive immediate feedback through chats and forums; flexibility in time made them to work effectively.

Computer Mediated Communication (CMC)

The 6 items (2, 3, 22, 23, 24, and 25) grouped in this category were used to match the fourth sub-problem of the first research problem.

Sub-Problem Four:

P1.4 How do the students perceive the supplied computer mediated communication?

To answer this question, and determine the level of students' perceptions on each item of the sub-scale "Computer Mediated Communication", descriptive statistics were used. For each item; the means, standard deviations, and the distribution of responses to five-point spread of ratings (SA, A, N, D, SD) are illustrated in Table 5.9.

Table 5.9. Descriptive Statistics of Students' Perceptions on Items Relating to "CMC".

Item Statement	SA	A	N	D	SD	N=175 Mean	Std. Deviation
Q2 The forum was very beneficial to understand each other's ideas.	80	73	19	3	0	4.31	0.73
Q3 I used the chat very frequently to communicate with the other group members.	51	56	51	13	4	3.78	1.02
Q22 The absence of social context did not effect me negatively to work on the project.	61	65	38	8	3	3.99	0.95
Q23 All group members participated in online discussions equally.	70	53	35	9	8	3.96	1.11
Q24 As a group, we did not have any communication delay.	70	52	28	19	6	3.92	1.14
Q25 It did not take too much time to make decisions on the project through online communication.	60	65	41	5	4	3.98	0.95
Sub-scale CMC						3.99	0.66

As it can be seen from the table, students' perceptions on each of 6 items signal high perception levels with high mean scores, where the overall mean score is 3,99 for this sub-scale. This enlightens the results illustrated in Table 5.1. The histogram showing the distribution of the responses to the individual items is given in the Figure 5.4.

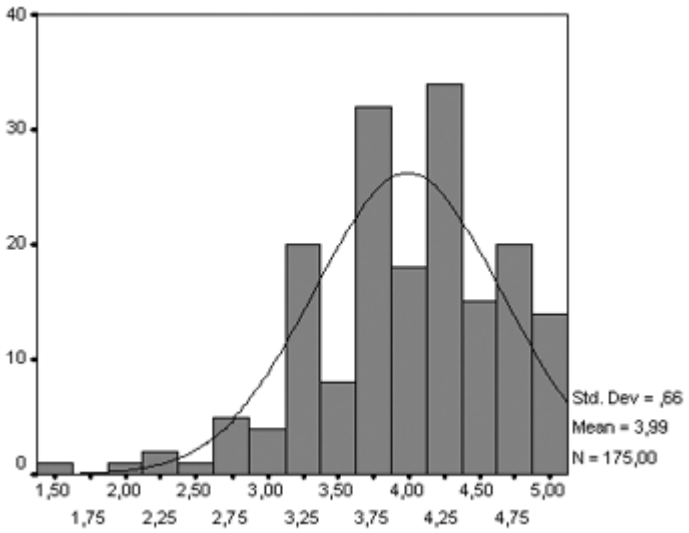

Figure 5.4. Histogram of the Distribution of Responses to Items Relating to "CMC".

The histogram indicates a left-skewed distribution where the median is greater than the mean value. As supported by data in tables and the histogram above, it is indicated that students' perceptions about supplied CMC in the online learning environment in the web-based course CSIT444 are mostly favorable.

The students' responses to the items in the sub-scale "CMC" reveal their agreement on the supplied computer mediated communication presented in Table 5.10.

Table 5.10. Computer Mediated Communication as Perceived by the Students

Item	Agreement (SA+A)		Supplied CMC
	Frequency	Percentage	
Q2	153	87.4	Usability of the forum for sharing ideas
Q3	107	61.1	Usability of the chat tools for communicating with the other group members
Q22	126	72.0	Usability of CMC for compensating the lack of social context to work for the group project
Q23	123	70.2	Usability of CMC for online discussions
Q24	122	69.7	Usability of CMC for uninterruptible communication
Q25	125	71.4	Usability of CMC for making quick decisions

As a result, the forum was very beneficial for the students to exchange their ideas; they used the chat very frequently to communicate with the other group members; the absence of real social context did not effect them negatively to work on the project; all group members participated in online discussions equally; they did not have any communication delay; it did not take too much time for them to make decisions on the project through online communication.

Group Work

The 6 items (9, 11, 16, 17, 18, and 19) grouped in this category were used to match the fifth sub-problem of the first research problem.

Sub-Problem Five:

P1.5 How do the students perceive facilitated group work in the course?

To answer this question, and determine the level of students' perceptions on each item of the sub-scale "Group Work", descriptive statistics were used. For each item; the means, standard deviations, and the distribution of responses to five-point spread of ratings (SA, A, N, D, SD) are illustrated in Table 5.11.

Table 5.11. Descriptive Statistics of Students' Perceptions on Items Relating to "Group Work".

Item Statement	SA	A	N	D	SD	N=175 Mean	Std. Deviation
Q9 The number of people in my group was appropriate.	87	65	19	4	0	4.34	0.76
Q11 We could not accomplish this project unless we worked together.	65	57	32	19	2	3.94	1.05
Q16 The arguments in the group were fruitful.	70	78	21	4	2	4.20	0.82
Q17 On many instances it was easy to conduct an online discussion.	77	52	32	11	3	4.08	1.01
Q18 The group leader did a well job on summarizing things and scheduling.	104	46	19	3	3	4.40	0.88
Q19 I would rather work alone for this project.	57	27	41	32	18	3.42	1.37
Sub-scale Group Work						4.06	0.56

As it can be seen from the table, students' perceptions on each of 6 items indicate high perception levels with high mean scores, where the overall mean score is 4,06 for this sub-scale, which supports the results illustrated in Table 5.1. The histogram showing the distribution of the responses to the individual items is given in the Figure 5.5.

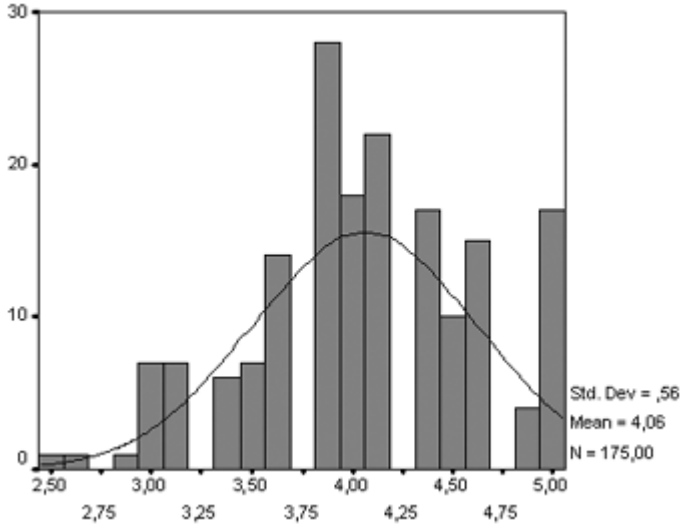

Figure5.5. Histogram of the Distribution of Responses to Items Relating to "Group Work".

The histogram indicates a left-skewed distribution where the median is greater than the mean value. As supported by data in tables and the histogram above, students' perceptions about the facilitated group work in the online learning environment in the web-based course CSIT444 are mostly favorable. The item Q19 in this sub-scale was negatively worded and the results show that there are some students who did not pay attention to this point. This might be the reason why the lowest perceptions response by students was on this item, with the lowest mean between sub-scales value of 3.42.

The students' responses to the items in the sub-scale "Group Work" show their agreement on the facilitated group work presented in Table 5.12.

Table 5.12. Group Work Facilitation as Perceived by the Students

Item	Agreement (SA+A)		Facilitated group work
	Frequency	Percentage	
Q9	152	86.8	Appropriate number of students for the groups (5 or 6)
Q11	122	69.7	The indispensability of working together to complete big projects
Q16	148	84.5	Enjoyable arguments in the groups
Q17	129	73.7	Usability of online discussions
Q18	150	85.7	Group leader role for summarizing and scheduling
Q19	84	48.0	Preference of individual work

As a result, the number of students in each group was 5 or 6, which was an appropriate group size; group work was necessary to accomplish the project; the arguments in the group were fruitful; on many instances it was easy to conduct an online discussion; students were content with the group leader's summarizing things and scheduling; some students preferred individual work. Again the results show that there are some students who did not pay attention that the item Q19 was negatively worded.

5.1.2 Qualitative Results

Qualitative data from the questionnaire were collected from those students responding to the single open-ended item in the questionnaire which contributed to match the third research problem. This open-ended item asked students to write their additional comments or opinions in the text box placed at the bottom of the questionnaire.

Of the 175 students, 129 answered the open-ended item in the questionnaire. Hence %74 of the participants in the study wrote comments about their online learning

experiences by responding to the open-ended item as well as by ranking their perceptions on each 28 items of the questionnaire.

A careful examination of the student responses to the open-ended item created sixty six emerging themes (see Appendix F). Ten major themes were obtained after organizing them under similar purposes (see Appendix G). It seems that those participants who wrote comments on the questionnaire had mostly positive and also some negative feelings about their online learning experience. The responses to the questionnaire revealed that there are some significant factors contributing to a meaningful collaborative learning experience via CMC. The following themes emerged from the qualitative analysis of the responses to the open-ended question in the questionnaire:

1. The online course increased students' motivation
2. The course met its objectives
3. The online course was flexible and convenient for most learners
4. The course encouraged individual/self-directed learning
5. CMC was useful in enhancing students' collaboration
6. Students' perceptions on the use of group work
7. For some students, online instruction was a new concept to get used to and they preferred face-to-face interaction to online communication
8. Difficulties and problems involved in the online course
9. Technical problems were demotivating for students
10. Some students did not feel at ease using CMC

The online course increased students' motivation: A major group of students, 73 in total, reported that the online learning experience definitely increased their motivation for the course. While the online learning experience was reflected as enjoyable learning by 21 students, 31 students commented on their pleasure taking this course as online. Positive ideas were expressed by 15 students about the course web site in terms of the interface, design and used technology. It was reflected by 6 students that this course also motivated them to demonstrate what they have learned by developing their own homepage.

The course met its objectives: A considerable number of students, 56 in total, stated that they achieved the course objectives. Effectiveness, usefulness of the course was mentioned by 44 students pointing out their progress in understanding the subject to create effective web pages. According to 7 students, the course promoted learning together by requiring students to accomplish projects through collaboration. The remaining 5 students emphasized the course content as sufficient. The same group of students also considered the completion of their group projects as a chance to use and apply what they have learned in the course throughout the semester.

The online course was flexible and convenient for most learners: In total 42 students thought that the online course was flexible and convenient. Of this group, 21 of them thought that the course was generally beneficial due to its being flexible and convenient, without giving a specific reason. According to 13 students, having easy access to lecture notes and the availability of the instructor at all times were the most convenient aspects of the online course. For the remaining 8 students, the course hours were flexible as they were not limited with only the specific course hours and they also stated that they gained time to study as the course was online.

The course encouraged individual/self-directed learning: In total 34 students were content with the course as it had facilitated their individual learning. Of this group, 24 drew attention to the fact that they felt more responsible for their own learning and thus worked more regularly. Those who reported that generally speaking they did more research, spent more time to study and more time for their project work were 8 in number. There were 2 students who thought that the course fostered creativity and helped their concentration respectively.

CMC was useful in enhancing students' collaboration: There were 8 students expressing their contentment with CMC by stating that chat and forum were both very useful and efficient for their learning as they exchanged ideas and found answers to all their questions.

The use of group work: In total 10 students commented on group work. Of these 6 expressed their contentment with group work as they were pleased with their group members. They also reported that with group work they became aware of their own characteristics as learners and also had an idea about the kind of problems that may emerge in such work. The remaining 4, on the other hand, were not so pleased with working in a group. There were 2 students who had no time to participate in the group work because of many assignments. Finally, when one stated that they did not like group work as everyone had a different working style the other mentioned the difficulty of meeting the group members.

Online instruction was a new concept to get used to: For 47 students, online instruction was a new concept to get used to and they seemed to prefer face-to-face communication in a learning environment for various reasons. Without giving a specific reason, 17 of them reported that it was just a new thing and different from what they were used to until that time. For 10 students, it was better to meet the instructor in person. Some students suggested a face to face session at the beginning of the semester as the first meeting to enable students to meet the instructor face to face and to have introductory information about the structure of the course, and features of the course web site. For 5 of them, the course would have been more beneficial if the instructor had made the necessary explanations face to face at the beginning of the term. They reported that since it was the first time they had taken such a course this would have been very helpful for them. There were 7 students drew attention to the fact that they did not use group chat and forum very often as the group members were close friends and they could already communicate face-to-face. Only 2 of the students reported that when they learned that the course was online they felt uncomfortable and worried about their performance. As for their learning from the online course, 3 of them said that they could have learned more if the course had not been online. Of the remaining students, 2 stated that it could have been better if the course had been combined with two hours of lecture weekly and one thought video could have been used for the conference session so that they could see the instructor.

There were some difficulties and problems regarding the online course: As for the difficulties and problems involved in the online course the students reported the following points:

- Chat sessions with the instructor were not enough (3)
- We definitely needed an assistant for this online course (2)
- I could have learned more if the course hadn't been online (2)
- We need more application/chat not enough for learning html (2)
- Chat sessions could have been better (using voice chat/net meeting while explaining the topic) (2)
- Course web site structure and interface design was problematic (2)
- I lost something in subjects (because it was online) (1)
- more self-study parts needed (1)
- misunderstandings in chat (1)
- arranging the chat time was difficult (1)
- we are not ready for this course as we like chatting (culturally), it takes time to get organized (1)
- in forum my friends sent unimportant messages for extra points (1)
- If I have no questions via mail and forum I will get less points (1)

As can be seen from the figures in the parentheses the students who expressed their discontent because of some difficulties and problems involved in the course were in minority and they had individual reasons, and nor did they seem to have a consensus about these problems.

Technical problems were demotivating for students: For 33 students the technical problems were demotivating. Of these students, 24 of them had connection problems and 4 had difficulties in browsing the page out of campus. The rest of the students had various technical problems, 2 of them for example failed to submit the course assignment. The remaining students had no access to computer at home, found the website complicated respectively. What one student reported was remarkable; s/he said that if they were not able to log on out of the campus and they

had connection problems there would not be much use in having an online course as they had to come to the university to use the computers.

Some students did not feel at ease using CMC: These students were few in number. Of the 6 students in total, 4 stated that for such a course, a course assistant was definitely needed. The other 2 did not find chat and forum useful for group work and found communication through these tools difficult respectively.

5.2 Results of the online learning environment analysis

The analysis of the online learning environment enabled the researcher through the examination of both the course and instructor's teaching style in detail to capture the essence of the design approach for the online course regarding the potential of the learning environment in providing learner benefits, learner support, motivation, computer-mediated communication, and group work. This analysis also aimed at investigating the possible factors that contributed to collaboration via CMC in a web-based course. Hence, the analysis of the learning environment contributed to match both to the second and third research problem.

Finder and Raleigh (1998) described four levels of Web use in a course: (level 1) Informational use, (level 2) Supplemental use, (level 3) Dependent use, and (level 4) Fully Developed Courses Delivered on the Web. Informational use of the Web was described as an environment where the course information such as course outline and assignments are available on the Web. Supplemental Web use includes students' use of the Web to complete part of the course and the learning materials generally include links to related sources. Dependent use is described as the most learning materials existing on the Web and students using the Web to complete the course assignments. Fully Developed Courses Delivered on the Web is viewed as using the Web to deliver the entire course.

Based on the above levels of Web use description, CSIT444 was seen as utilizing the all four levels of Web use. In terms of informational use, course outline, assessment descriptions and other general information were available on the web site (see Figure 5.6 and Figure 5.7).

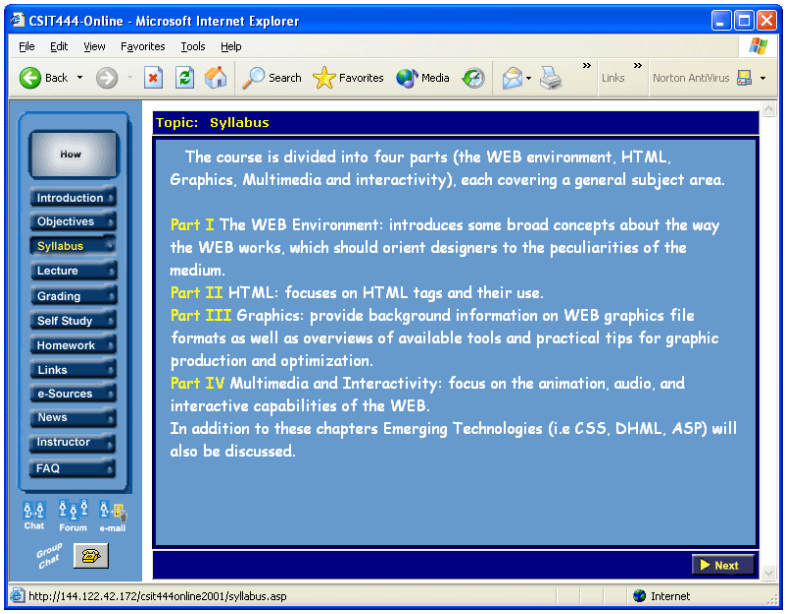

Figure 5.6. The Course Outline Page of the Course Web Site

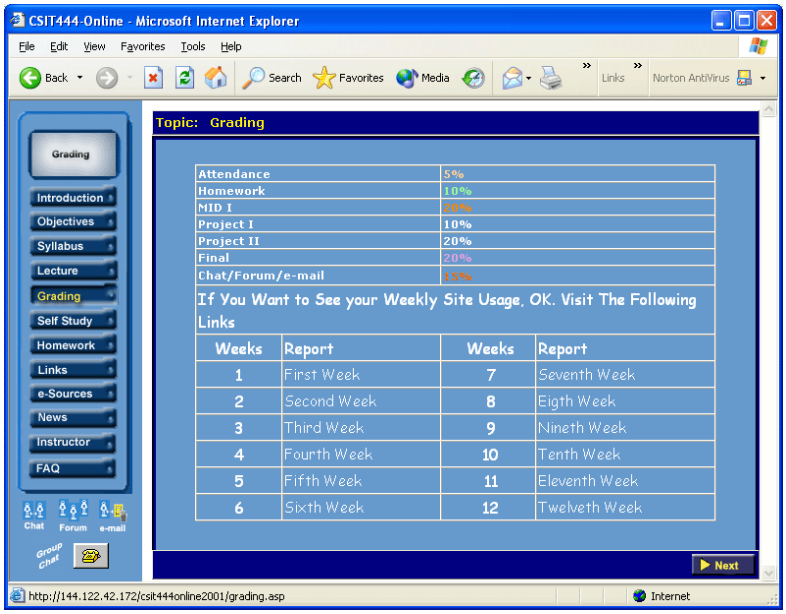

Figure 5.7. The Assessment Descriptions Page of the Course Web Site

For supplemental use, website links were provided to students (see Figure 5.8). As for dependent use, students were able to have access to most learning materials from the publisher, links to related sources and students' own initiative to conduct research on the assigned assignment topic.

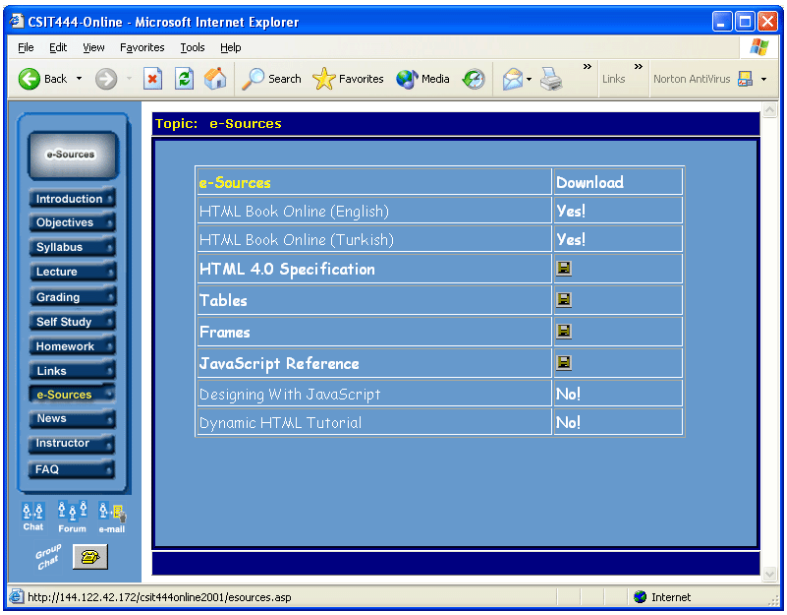

Figure 5.8. The e-sources Page of the Course Web Site

Qualitative data was collected through the researcher's notes in terms of course design, development and implementation. The course design approach of the course CSIT444 was put into practice based on an internet-based multimedia constructivist approach instead of an instruction-based design in order to keep up with the transition from the behaviorist approach to the cognitive and from the cognitive to the constructivist approach. The following principles of constructivism were added to the structure of the course: Good problem (related to real life), enriched instructional environment, group work and changing role of the instructor.

In order to find out whether the web-based course CSIT444 included design that contributes to a meaningful and effective online learning environment, the course was evaluated according to the instructional design framework provided by Herrington & Oliver (2000). This framework allowed the researcher to evaluate the learning environment comprehensively. The results include the following:

1. Provide authentic contexts that reflect the way the knowledge will be used in real life: The students were to demonstrate their progress in understanding the subject by accomplishing projects as a requirement of the course. The instructor designed two web design projects with the objective of helping the students apply what they have learned to real life situations. The first one was a personal home page to be prepared by using notepad and the programmes producing simple graphics and the second one was a group project to be completed until the end of the term, which would be a possible solution to a real life problem.
2. Provide authentic activities: After the completion of the first project students were asked to announce their possible topics for the second project in the forum and form groups of 5-6 in two weeks' time. The students were required to be present in the environment which they would create and gather information about it, thus being provided authentic activities for their given project.
3. Provide access to expert performances and the modelling of processes: The addresses of other websites where similar projects are discussed were given to students in order to provide access to expert performances and the modelling of processes. Students formed 18 groups and for each of which a chat and a forum room was created. They were asked to use these rooms for their second project work.
4. Provide multiple roles and perspectives: There was no subject restriction for the second project in order to encourage students to acquire various thinking skills and as many different points of view as possible, instead of just focusing on one single example or a method. Thus, students were provided with multiple roles and perspectives for their learning.
5. Support collaborative construction of knowledge: The social dimension of learning was intended to be incorporated by creating environments such as group chat and group forum rooms where students can have discussions and spend time together. In the chat sessions, the File Sharing and White Board features of MS-Netmeeting were used. Through desktop sharing the students were able to see the instructor's computer and he could show applications about web page design and synchronously the students could ask questions

through chat. This course provided opportunities for student collaboration to support collaborative construction of knowledge. Students were placed in small learning communities so that they could work collaboratively on their projects.

6. Provide coaching and scaffolding at critical times : The students were guided by the instructor when they need, being provided with coaching and scaffolding at critical times. The designed course environment was not only rich with organized and retrievable resources built with clear instructor guidance, but also with its constructed friendly network where a three-way interaction between the teacher, students, and external resources took place. Although the class was scheduled to meet weekly for two hours students could send e-mails to the instructor any time for their inquiries and their e-mails were usually replied in 24 hours' time.
7. Promote reflection to enable abstractions to be formed: Students were able to produce knowledge collaboratively through online discussions by using their subject specific knowledge and skills freely to promote reflection, which facilitated the formation of abstractions. However, due to their different levels of computer use and knowledge competence, and varying levels of interactions, their learning outcomes and emotional gains were different in each group. Students uploaded each version of their projects progressively for public viewing on the course site to discuss about their products.
8. Promote articulation to enable tacit knowledge to be made explicit: For weekly assignments, students used the discussion forum to post their comments. Group chat and group forum rooms served for all interactive communications to create a chance for the students to demonstrate what they have learned by working in small groups and having discussions. This helped students to promote articulation and to enable them to make tacit knowledge explicit.
9. Provide for integrated assessment of learning within the tasks: The assignments given in the CSIT-444 course were prepared in line with the basic components of the final project in order to provide integrated assessment of learning within the tasks. The evaluation of the course was based on midterm, assignments, projects and website use.

The course CSIT 444 included a design structure which was contributing to a meaningful and effective online learning environment according to the instructional design framework provided by Herrington & Oliver (2000). The online learning environment was designed as fully developed course delivered on the Web where the teaching and learning is technology oriented. This course emphasized the interpersonal communications, both online and in-person, and provides an effective knowledge transfer environment model with the premise that technology is merely used as a tool rather than serves as the driving force. This designed framework is fundamentally based on the theory of constructivism and attempted to encourage collaboration. It is a networked learning environment for fostering inquiry in web design. It provides students a shared space for working productively with knowledge (see Figure 5.9). The system is used to organize students learning projects in the context of such domains of knowledge as web design issues. It is a framework expected to generate fruitful results for both teaching and learning if applied and used appropriately.

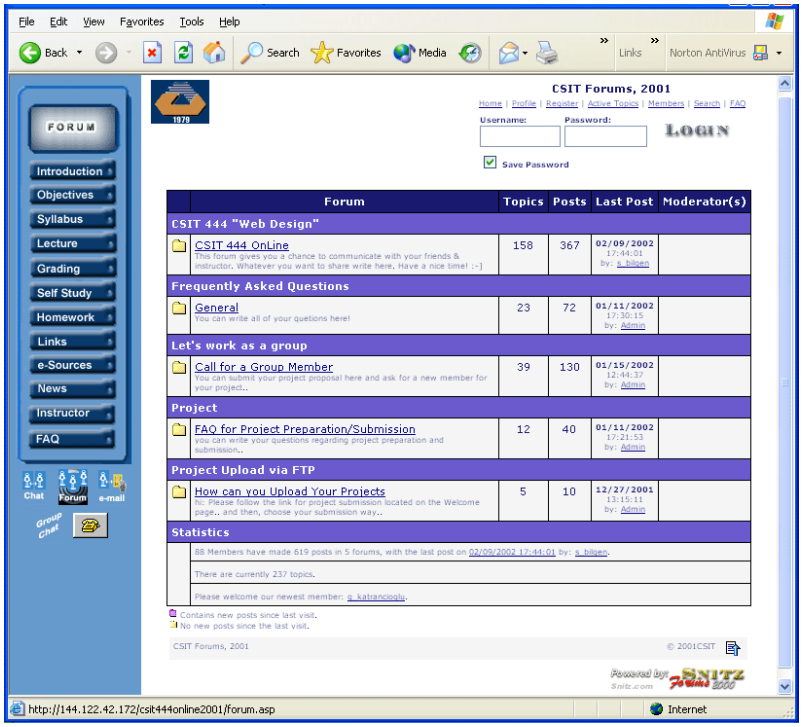

Figure 5.9. The Forum Page of the Course Web Site

5.3 Results of Informal Interviews with the Instructor

In this study several interviews were conducted with the instructor by using the informal conversational interview approach to gather and record reflections on his online teaching experience in a web-based course for three semesters. This method was mainly utilized to capture the instructor's perceptions about the potential of the learning environment in providing learner benefits, learner support, motivation, computer mediated communication, and group work regarding the second research problem and each of its five sub-problems. In addition, interviews created opportunities for the researcher to gain valuable data both about the online learning environment and the possible factors that contributed to online collaboration through CMC, thus, referring to the third research problem.

Informal interviews were arranged with the instructor at convenient times, therefore, the interview sessions varied in terms of their duration. Some of the questions in the interviews were predetermined but follow-up and probing questions were also used to explore the responses during the conversation with the instructor.

Following the techniques of qualitative analysis recommended by Miles and Huberman (1994), the researcher worked on the output from the interviews by determining the categories of responses from which important themes were drawn in terms of their relevance determined by the research problems. The results were displayed on a framework based on the research problems of this study and the categories provided by Collins and Berge (1996).

The instructor emphasized the changing roles of both the students' and the instructor's in an online learning environment. According to the responses the changing role for the instructor was defined as a facilitator or a moderator. The interview results related to the roles of the online facilitator were displayed with respect to the aspects of the online course on the framework categorized by Collins and Berge (1996) into four areas: (1) pedagogical, (2) social, (3) managerial, and (4) technical.

Pedagogical aspects:

This category is related to educational facilitation. Since CSIT444 was offered as a fully developed online course, the pedagogical aspects were applicable. Expressing his thoughts about online teaching, the instructor mentioned some pedagogical issues, and emphasized that online teaching was really a lot different from traditional teaching. The instructor was content that the Internet technologies allowed him to present information to his students clearly. He expressed his ideas in the following way:

> *In online teaching you have more time and opportunity to think about what you are going to say and to do research before answering a particular question. Unlike in a traditional classroom, you write a comment to students and then read it later and may be change it before sending it out. Furthermore, you can exchange ideas quickly through online collaboration tools to create a meaningful collaborative learning environment for both parties.*

He felt that his strengths as an instructor were maximized in this way and highlighted the importance of collaboration in an online learning environment. Another point the instructor mentioned was that the nature of interaction among the students and between the students and the instructor was very different than that of a traditional classroom because he and his students were exchanging messages to reply to online discussion questions. He commented on these differences and talked about the online teaching style in the following way:

> *Before teaching the course, I had thought that my role would be more like a facilitator rather than a lecturer but when I started teaching I saw that my role was in fact more like an information provider. Most of these teaching sessions were in the form of monologues as if in a traditional classroom. After a few online sessions the topics were categorized in discussion forum to encourage self-directed learning. When the students, however, were leading in an unwanted direction then I would have to guide them again.*

The instructor also drew attention to some of the drawbacks likely to emerge and how he handled them himself:

> *I was already expecting some of the drawbacks. I already knew that I would have to be present, be there for the students all the time so I tried to log in as often as possible to compensate for my visual absence in their learning. This made the discussion forum work very well and students did not seem to need any guidance from me.*

Another thing the instructor commented on was the absence of visual cues which would be present in face-to-face communication:

> *In online teaching I don't even have an idea about what my students look like. In a traditional classroom I get a lot of information from my students', facial expressions and body language and I can learn about their immediate reaction about what I am saying. Most importantly I have eye contact with them, which shows how attentive they are to what is being lectured on. In online environment however you don't know that they are there until they participate.*

Having said these he also added that the absence of face-to-face communication, i.e. two parties not seeing each other was not such a big drawback as he thought it would be.

Social aspects:

Social function was described as the promotion of friendly social environment which is needed in the process of online learning. The instructor also stated how important it was to create a sense of community in an online environment with the following words:

> *In online learning the social dimension of learning is created by providing students with group chat and discussion forum rooms where students can have discussions and share their ideas. The online group projects contributed to learners' socialization as students have learned both how to work together with their group members and also work as a whole community, thus having a sense of group identity as it would be in a classroom.*

As for promoting learning in such a community, the instructor highlighted the importance of creating a friendly environment and added that collaboration is a very effective way to create a community. Moreover, he said that:

> *The individuals' depending on each other for their own learning is something that keeps the community together and it is in fact the whole process of collaboration that brings the community into existence.*

He informed that the relationships in online learning environments have become collaborative partnerships.

Managerial aspects:

Managing the online teaching of a course involves many components such as preparing the syllabus, determining the objectives of forum and chat, the procedures to be followed, and the general methodology of the course. The instructor made the following comments about the management issues:

> *In order to provide a rich learning environment for the students I planned all the course activities in detail and organized all the resources for students' easy access. Clear guidance is an indispensable characteristic of an online learning environment especially for the group projects and forum to run smoothly. Since there is a triadic interaction between the teacher, students, and external resources, establishing and managing the network gains utmost importance.*

Another point the instructor raised was that an online course was more demanding both in terms of preparing the course content and carrying out the course than his previous classroom experiences:

> *In a traditional course you get prepared for the lectures teach it at a specified time and answer students' questions then leave the classroom. However, in an online course students should have access to the instructor and need to get all their questions answered at all times.*

Although the class was scheduled to meet weekly for two hours, students could send e-mails to the instructor any time for their inquiries and their e-mails were usually replied in 24 hours' time. The instructor emphasized the importance of responding and addressing to the students' queries promptly and adequately. What students defined as 'time flexibility of an online course" in the questionnaire, in other words, is extra course load and extra time allocated to students from the instructor's point of view. Another managerial issue mentioned by the instructor is related to the increased number of questions asked by the students as compared to a classroom environment:

> *In traditional classroom courses I regularly teach, I spend a lot of time to encourage students to have a discussion, and to ask and answer questions. While students may not ask many questions in a classroom environment, in online learning students ask a lot of questions and thus participate in the lesson and the discussion more actively.*

Since the online learning environment provides opportunities for students to ask more questions and contribute to discussions, the instructor has to answer more questions and give more feedback compared to classroom teaching, this would in itself bring the importance of another managerial role into question.

Technical aspects:

The technical aspect of the course is first of all related to how comfortable and proficient the instructor is with using technology. As stated by the instructor first the online facilitator himself must use the technology competently:

> *I spent time and effort in constructing the technical infrastructure for the online course including the operational system, the software. My background knowledge allowed me to choose the right technology carefully that would support the course effectively on the web.*

He also underlined the importance of ensuring that participants were comfortable with the system and the technology resources that would enhance their learning.

I decided on the content to be appropriate for delivery on the Web and I paid attention to overcome the technical problems that would occur during the online class sessions. This is very important in terms of the interactions in the online learning environment because technical problems may have a demotivating effect on students.

Finally he said that learning in the online environment could only be enjoyable and satisfactory with the mastery of technology.

5.4 Conclusions

The interpretation of the results generated the following conclusions presented on a framework concerning the research problems.

5.4.1 Research Problem One

P1 How do the students perceive the impact of the online learning environment in terms of their benefits, supplied support, motivation, computer-mediated communication (CMC), and group work?

The underlying sub-problems to explore the first research problem were:

P1.1 How do the students perceive their benefits in the course?

P1.2 How do the students perceive motivational factor in the course?

P1.3 How do the students perceive learner support in the course?

P1.4 How do the students perceive supplied computer mediated communication?

P1.5 How do the students perceive facilitated group work in the course?

The answers for all these questions above were sought by determining the level of students' agreement or disagreement on each of the 28 items on the OCLEQ

instrument. All items were grouped in five sub-scales (factors) concerning student perceptions about a) learner benefits, b) motivation c) learner support d) computer mediated communication (CMC) and e) group work.

The quantitative results of the questionnaire responses reported an overall mean score of 4,17 for all items (4=agree, 5=strongly agree) which indicates that the majority of the items were ranked between agree, and strongly agree. Moreover, by examining the tables and histograms provided in this chapter relating to the results of the students responses to the questionnaire it is clear that the students reported a high mean score for each of five sub-scales respectively as: learner benefits (overall mean score of 4,28), motivation (overall mean score of 4,24), learner support (overall mean score of 4,30), CMC(overall mean score of 3,99), group work (overall mean score of 4,06). As a result, it is concluded that most students perceived the online collaborative learning experience positively and they reported that it was a beneficial, motivating experience with the availability of group work, CMC, and adequate support structure.

The qualitative results emerged as themes, which were based on the analysis of the student responses to the open-ended item in the questionnaire, were supporting and consistent with the above aforementioned quantitative results of the questionnaire.

The interpretation of these themes concluded that the online learning experience definitely increased students' motivation for the course and reflected as enjoyable learning. Most of the students stated that they achieved the course objectives by emphasizing the effectiveness and usefulness of the course. They mentioned the flexibility and convenience of the course as having easy access to lecture notes and the availability of the instructor at all times. It is reflected by the students that the course encouraged individual/self-directed learning and CMC was useful in enhancing collaboration. While most of the students were positive with group work some of them were not so pleased with working in a group. They reported that with group work they became aware of their own characteristics as learners and also had an idea about the kind of problems that may emerge in such work. Since online

instruction was a new concept to get used to some students seemed to prefer face-to-face communication in a learning environment for various reasons. Although some students reflected some difficulties and problems regarding the online course most students commented positively about their online learning experience.

Thus, together with the analysis of both quantitative and qualitative results obtained through the questionnaire, it is concluded that *students' perceptions about the impact of the online learning environment in terms of their benefits, supplied support, motivation, computer-mediated communication, and group work are mostly favorable.*

As a conclusion, the analysis based on the results of the questionnaire responses indicated that the most students -who participated in the online course CSIT 444 at Eastern Mediterranean University during the fall and spring semester of 2002, and the fall semester of 2003- perceived their collaborative learning experience in the online learning environment positively.

5.4.2 Research Problem Two

P2 How does the instructor perceive the potential of the online learning environment in providing learner benefits, learner support, motivation, computer-mediated communication, and group work?

The underlying sub-problems to explore the second research problem were:

P2.1 How does the instructor perceive providing learner benefits?

P2.2 How does the instructor perceive providing motivation?

P2.3 How does the instructor perceive providing learner support?

P2.4 How does the instructor perceive the supplying CMC?

P2.5 How does the instructor perceive the facilitation group work?

Examining the results of the online learning environment analysis indicated that the course CSIT 444 included a design structure which was contributing to a meaningful and effective online learning environment. Based on the evaluation according to the framework by Herrington & Oliver (2000), the course CSIT 444 provided authentic contexts that reflected the way the knowledge is used in real life by providing authentic activities and enabling access to expert performances and the modelling of processes; by providing multiple roles and perspectives; by supporting the collaborative construction of knowledge; by promoting reflection to enable abstractions to be formed; by promoting articulation to enable tacit knowledge to be made explicit; by providing coaching and scaffolding by the teacher at critical times; and by providing for authentic assessment of learning within the tasks. This course emphasized the interpersonal communications, provided a shared space for working productively to encourage collaboration.

Similarly, analyzing the results of the interviews with the instructor indicated that his instructional roles and aspects of the course according to the framework categorized by Collins and Berge (1996) fit under the category of all pedagogical, social, managerial, and technical areas. In terms of the pedagogical aspects, the instructor acted as a facilitator and provided opportunities for quick exchange of ideas through online collaboration tools to create the meaningful collaborative learning environment. As for social aspects, the social context was promoted by allowing students to interact via email, discussion forum and chat tools. In terms of managerial aspects, the resources, activities, discussions, group projects were carefully planned, organized, and facilitated with a clear guidance. Moreover, communication, collaboration, and coordination were managed for the group work through the network where three-way interaction between the instructor, students, and external resources takes place. With respect to technical aspects, the instructor was proficient and comfortable with using the technology and he paid attention to overcome the technical problems that might occur.

Upon these results it is concluded that the *instructor's perceptions about the potential of the online learning environment in providing learner benefits, learner support, motivation, computer-mediated communication, and group work are mostly favorable.*

As a result, the interpretation of the researcher's notes, and the output from the informal interviews based on the results of the qualitative analysis of online learning environment and interviewing the instructor, indicated that the online course CSIT 444 at Eastern Mediterranean University offered during the fall and spring semester of 2002, and the fall semester of 2003 was perceived as a positive online teaching experience for the instructor in terms of managing an online collaborative learning environment in which group projects were conducted via CMC.

5.4.3 Research Problem Three

P3 What are the factors that contributed to collaboration via CMC in a web-based course?

Answer was sought to this question through the interpretation of the results based on qualitative analysis of responses to the open-ended question in the OCLEQ, analysis of the online learning environment and informal interviews with the instructor.

The results of the OCLEQ revealed the students' perceptions about the factors including learner benefits, motivation, learner support, computer mediated communication (CMC), and group work within the online learning environment. The overall mean value of each factor was between 3.99 and 4.30. The majority of the items were ranked between agree, and strongly agree. In fact, each factor included in the questionnaire is considered to be as one of the main components of the online collaborative learning. Students reported high mean scores for each factor in the questionnaire as 4.28 for "Learner Benefits"; 4.24 for "Motivation"; 4.30 for "Learner Support"; 3.99 for "CMC"; 4.06 for "Group "Work". These high mean scores for each of five factors indicating the students' agreement on the unrestricted list of items on each factor. This suggests that the study should consider those factors in the questionnaire as the factors that potentially could affect the student collaboration via CMC in the web-based course. Therefore, the core idea in the items

related to learner benefits, motivation, learner support, computer mediated communication (CMC), and group work are all considered to be the factors that contributed to collaboration via CMC in this web-based course CSIT 444 in the following way:

- Perceived learner benefits
  - A better understanding of different perspectives by working as a team
  - Opportunities for learning together
  - Improvement of the interpersonal skills by working as a team
  - A better understanding for the subject matter by working with teammates
  - A better understanding of the topics through chats and forums
  - Being endowed with better skills to develop a pleasing web site
  - Professional growth by working on the term project through online communication
  - Socialization by working on the project through online communication

- Providing motivation
  - Using the forum and chats is increasing motivation towards the subject
  - Working as a team is increasing motivation towards the subject
  - Appreciating the mood of the team is encouraging hard work
  - Enjoyment of working with teammates

- Providing learner support
  - Adequate resources in order to search for the answers to the questions
  - Having no difficulties in accessing the web site of the course
  - Being able to receive immediate feedback through chats and forums
  - Flexibility in time to work effectively.

- Supplying CMC
  - Usability of the forum for sharing ideas (the forum for sharing ideas)
  - Usability of the chat to communicate with the other group members (Chat to communicate with the other group members)
  - Usability of CMC for compensating the lack of social context to work for the group project
  - Usability of CMC for online discussions

    - Usability of CMC for uninterruptible communication (Uninterruptible communication through CMC)
    - Usability of CMC for making quick decisions (Making quick decisions through CMC)

- Group work facilitation
    - Appropriate number of students for the groups (5 or 6)
    - The indispensability of working together to complete big projects
    - Enjoyable arguments in the groups
    - Usability of online discussions
    - Group leader role for summarizing and scheduling
    - Preference of individual work

The interpretation of the themes emerged from the qualitative analysis of the student responses to the open-ended item in the questionnaire also supported high level perceptions of the above factors and generated some other important factors that may contribute to collaboration using CMC in the web-based course:

- Increasing student motivation
    - with enjoyable, motivating course
    - with using reliable technology
    - with good designed course website.

- The course objectives should be met
    - Providing a chance to use and apply what they have learned in the course

- Flexibility and convenience
    - Providing easy access to lecture notes, related resources and the availability of the instructor at all times

- Encouragement of individual/self-directed learning
    - Facilitation of individual learning in order to foster creativity and concentration
    - Providing sufficient communication and interaction for enhancing students' collaboration

- Providing CMC tools for student learning to exchange ideas and find answers to their questions.

The online learning environment analysis results were interpreted once again within the context of this research study to determine the contributing factors of student collaboration via CMC in the web-based course. Providing an effective online learning environment as the educational setting on which learning materials and the course content presented are the essential components of online learning. Examining the results of the online learning environment analysis based on the framework provided by Herrington & Oliver (2000) also supported the previous conclusions regarding the potential of the online learning environment in terms of the above factors and generated the following factors:

- Providing authentic contexts that reflect the way the knowledge will be used in real life
  - to demonstrate student learning progress in understanding the subject by accomplishing projects which would be a possible solution to a real life problem as part of the activities in the course

- Providing authentic activities
  - to be present in the environment which they would create and gather information about it as the authentic activities for their given project

- Provide access to expert performances and the modelling of processes
  - The addresses of other websites where similar projects are discussed were given to provide access to expert performances and the modelling of processes.

- Provide multiple roles and perspectives
  - to encourage students to acquire various thinking skills with as many different points of view as possible instead of just focusing on one single example or a method

- Support collaborative construction of knowledge
  - creating environments such as group chat and group forum rooms for small learning communities where students can have discussions, spend time together, and work collaboratively on their projects.

    - using collaboration tools such as file sharing and white board to provide opportunities for student collaboration to support collaborative construction of knowledge.

- Provide coaching and scaffolding by the teacher at critical times
    - clear instructor guidance for the interaction between the instructor, students, and external resources to provide coaching and scaffolding at critical times.

- Promote reflection to enable abstractions to be formed
    - produce knowledge collaboratively through online discussions about their ideas, opinions, and their products.

- Promote articulation to enable tacit knowledge to be made explicit
    - to create a chance for the students to demonstrate what they have learned by working in small groups and having discussions through interactive communications like group chat and group forum rooms.

- Provide authentic assessment of learning within the tasks.
    - Preparing assignments in line with the basic components of the final project

The output of the interview results was categorized into emerging themes based on the framework provided by Collins and Berge (1996). The resultant themes were examined once again through the process of interpretation of the feedback to determine the significant factors for student collaboration via CMC in the web-based course. The interpretation of these themes also supported high level perceptions of the factors mentioned above and generated other important factors:

- Pedagogical aspects
    - exchange ideas quickly through online collaboration tools to create a meaningful collaborative learning environment
    - being aware of the drawbacks likely to occur in an online environment and to know how to handle them
    - utmost continuous facilitator presence in the online environment for compensating the absence of face-to-face interaction.

- Social aspects
  - promoting the social context by allowing students to interact via email, discussion forum and chat tools
  - to create a sense of community in an online environment through group chat and discussion
  - Creating a friendly, social environment in which learning is promoted.

- Managerial aspects
  - To plan and organize the resources, activities, discussions, group projects carefully and to facilitate them with a clear guidance.
  - Managing communication, collaboration, and coordination for the group work through the network where three-way interaction between the instructor, students, and external resources takes place.

- Technical aspects
  - being proficient and comfortable with using the technology and he paid attention to overcome the technical problems that would occur.

CHAPTER 6

DISCUSSIONS, IMPLICATIONS AND RECOMMENDATIONS

In this final chapter, after a brief summary of the research study, the conclusions of the present study and their interpretation will be discussed. This chapter also includes the summary of the procedures of the study, discussion of the conclusions, implications for practice and finally recommendations for further research.

6.1 Summary of the procedures of study

The examination of previous research through the literature review demonstrated a significant need to determine and understand the factors that support the communication in virtual learning environments for computer-supported collaborative learning. Therefore, the purpose of this study was set up to explore the factors that contributed to online collaboration in a web-based course through the investigation of the impact and the potential of the online learning environment in terms of both the students' and instructor's perceptions about learner benefits, learner support, motivation, computer mediated communication (CMC), and group work.

In the light of the purpose stated above, this study focused on the following sub-problems:

Problem 1. How do the students perceive the impact of the online learning environment in terms of their benefits, supplied support, motivation, computer-mediated communication (CMC), and group work?

- P1.1 How do the students perceive their benefits in the course?
- P1.2 How do the students perceive the motivational factor in the course?
- P1.3 How do the students perceive learner support in the course?
- P1.4 How do the students perceive supplied CMC?
- P1.5 How do the students perceive facilitated group work in the course?

Problem 2. How does the instructor perceive the potential of the online learning environment in providing learner benefits, learner support, motivation, computer-mediated communication, and group work?

- P2.1 How does the instructor perceive providing learner benefits?
- P2.2 How does the instructor perceive providing motivation?
- P2.3 How does the instructor perceive providing learner support?
- P2.4 How does the instructor perceive the supplied CMC?
- P2.5 How does the instructor perceive the facilitation group work?

Problem 3. What are the factors that contributed to collaboration via CMC in a web-based course?

A mixed methods case study design was thought to be appropriate to match the purpose of the study. This study design will enable the researcher to explore beyond the limitations of simple questioning. Thus, this study used the combination of components normally found in descriptive, case study and qualitative research studies. The online course "CSIT444-Online Web Design" offered by the Institute of Distance Education of East Mediterranean University was found to meet the purpose of this research therefore, it was selected as the case to study. The online learning environment offered in this course was selected purposefully as information-rich case, as it was qualified in terms of offering good practices for collaborative distance learning via CMC. Therefore, the methodology used to select participants in this study was purposive strategies in particular, convenience and

criterion sampling. The participants of this study, who participated in the web-based course CSIT444 during the three successive semesters, were the instructor and the total number of 209 last year students at the vocational School of Computing & Technology of East Mediterranean University (EMU). This case study collected data during the fall and spring semester of 2002 and the fall semester of 2003 consecutively in order to reach the ample data for supplying a comprehensive analysis of the online learning environment. It was also intended to provide a detailed exploration of the factors contributed to effective collaboration via CMC in the web-based course.

In order to explore the perceptions of the students, they were asked to complete a questionnaire at the end of the each semester. The OCLEQ included twenty eight five-point Likert type items and one open-ended item; 175 students ranked their agreement on each twenty-eight item and 129 of them also wrote their comments about their online learning experience by answering the open-ended question.

Several interviews were conducted with the instructor using the informal conversational interview approach to explore his perceptions through his reflections on his online teaching experience in the web-based course.

As for the analysis of data, both quantitative and qualitative methods were used to examine the collected data. Descriptive statistics were run to analyze the collected data for the first research problem. For the second and third research problems, data were analyzed using qualitative analysis processes. The use of mixed methodology provided a broad perspective of the learning and teaching experiences of the participants in the study. The perceptual student responses from the Likert-type items in the OCLEQ were analyzed quantitatively. The responses to the open-ended question in the questionnaire and informal interviews were evaluated qualitatively to find out the emerging themes. The interview results related to the roles of the online facilitator were displayed with respect to the aspects of the online course on the framework categorized by Collins and Berge (1996). In addition, the online learning environment offered in the web-based course was examined by comparing it to the instructional design framework provided by Herrington & Oliver (2000) for analyzing the course design.

Finally, the results and conclusions were presented with reference to the research problems. As Patton (1990) stated analysis and interpretation balance description, therefore, the results of the study were interpreted with examples drawn from the collected data in order to produce a rich description and explanation for understanding the participants' learning and teaching experiences in the web-based course. The next section will present the discussion of the results and conclusions of the overall study by considering the previous research studies.

6.2 Discussion

The developing ICT, especially the Internet technologies provide many opportunities for both conventional and distance education by supporting interactive communication and collaborative construction of knowledge. Web technologies providing these opportunities are considered as one of the major areas of pressure causing colleges and universities to start changing rapidly (Brown & Duguid, 2000). Turoff (2000) noted that:

> "Consumerism will be an evolving force in the future of educational institutions. Without a geographical monopoly, institutions of higher education will be far more sensitive to consumer pressures than they have been in the past" (p. 4).

As a consequence of these changes, online courses have increased in popularity because of their flexibility and convenience. Thus, the increasing demand for online courses created considerable pressures on institutions of higher education for web-based course offerings.

> "Certainly, educators are concerned with the quality of the education in distance learning environments. Administrators are concerned with the additional cost of delivery and the possible net gain in reaching larger and more far flung audiences of learners. And the public is concerned with the belief that high technology is justified only if it ensures high achievement in learning" (Rogers, 2001, p.2).

The learners are the determinant on this pressure as the most affected subject by education, considering the flexibility and convenience of an online course. Learners look forward to distance education to be high in quality, convenient, learner-centered and interactive (Rogers, 2001). As distance learning increases in popularity, educational institutions and universities must examine the factors that motivate students in online learning environments (Roblyer, 1999). Existing online programs and courses should be examined thoroughly in order to assure the stakeholders that online course offerings will provide meaningful and rich learning environments. It is particularly crucial to obtain valuable information for understanding the perceptions of students in the existing online course offerings in terms of different aspects. Savery (2002) signified that:

> "examining the perceptions of a target audience is a widely used strategy based on the premise that perceptions matter and often influence behaviors" (p.1).

This research study examined both the impact and the potential of the online learning environment in which group projects were conducted. The examination was done through the exploration of both the students' and the instructor's perceptions in terms of learner benefits, motivation, learner support, computer mediated communication, and group work.

Combining the first two conclusions, this case study concluded that both students' and the instructor's perceptions are generally favorable about the impact and the potential of the online learning environment in terms of the following factors respectively: a) learner benefits, b) learner support, c) motivation, d) computer-mediated communication, and e) group work. It is concluded that both the students and the instructor perceived the online collaborative learning/teaching experience positively and they reported that it was a beneficial, motivating experience with the availability of group work, CMC, and adequate support structure. Results of another study by Nachmias, et al (2000) also indicated that involvement in a web-based course contributed to collaborative work. An earlier research study by Chin (1999) also pointed out that students' responses were very consistent when asked about the certain aspects of web-based teaching and learning. He also stated that previous research studies on students' perceptions of web-based teaching and learning also have indicated that the use of the Internet in teaching is well received by students in

general. As for the instructor's perception, the results of the present study were also consistent with that of Bruess (2003) in that the instructors' experience and perception of their technology use in teaching were rather positive. Moreover, Almeda & Rose (2000) reported that instructors were generally satisfied with the online teaching experience. The findings of this study additionally support the fact that in online learning environments students' rate of contentment is fairly high especially when they are involved in group projects (Nachmias, et al., 2000; Colbeck et.al, 2000; Tucker et al, 1997; Annand & Haughey, 1997; Gergits & Schramer, 1994)

As the third conclusion of the study, several specific factors that contributed to collaboration via CMC in the web-based course were identified under seven major topics. These factors were drawn from the interpretation of the results obtained through the analysis of the data. In fact, these factors do not stand alone , but they are somehow in a nested form. The collaboration via CMC in the web-based course is influenced by the combination of these factors. Presenting them under major topics will help to organize them in a better form. These factors, now, will be discussed in detail by taking the appraisal of previous research studies into account.

Perceived benefits

Online learning itself brings many proven benefits for learners such as opportunity to learn anytime, anywhere and at their own pace. Learner benefits are maximized in an online learning environment which incorporates collaborative learning strategies. The findings of the study revealed the following specific factors in terms of perceived benefits: making students understand things from different perspectives; providing opportunities for learning together; improvement of the interpersonal skills; a better understanding for the subject matter and the topics; endowment with better skills; professional growth; socialization; flexibility and convenience; encouragement of individual/self-directed learning.

In the light of these findings we could say that to maximize the benefits from an online course, instructors should realize how beneficial it is for their learners and they should be able to transfer their area of expertise from face-to-face instruction to an online setting (Campos, et al, 2001).

Motivation

The risks involved in collaborative learning could stem from students' low motivation or not getting prepared for the course. Moreover, if they have no confidence regarding their knowledge and if they fail to understand the rationale of the activity, undoubtedly their participation and faith in the activity will be negatively affected. As such affective factors could be the main obstacles in the completion of the activities, a tasks should be carefully selected and specified to increase students' motivation (McAlister, 2001). The following specific factors emerged in this study in terms of motivation: using the CMC tools, working as a team, appreciating the mood of the team, enjoyment; reliable technology and good designed course website.

Motivation is considered to be a very important factor in all areas of education and in any learning medium, but it has utmost importance especially in the case of online courses for the academic success of both the instructor and the students. This is emphasized in several studies by Bodendorf & Schertler (2004), Gunn (2001), Herrington and et al (2001), Siragusa (2000), Hara & Kling (1999), Chin (1999). Komito (1998), and Ahern & Repman(1994).

Learner Support

In preparing a collaborative task students are engaged in, the framework should be designed in a way to support students (McAlister, 2001). The findings of this study suggested the following specific factors in terms of learner support: adequate resources; easy access; immediate feedback through CMC; flexibility; face to face session as the first meeting; a course assistant as a tutor.

A previous study by (Symons & Galpin, 1998) also indicated that tutor support needs to be greatest in the early stages of student involvement. As mentioned above, the factors suggested by this study are not independent of one another. The untested assumption by Akehurst (1997) is likely to prove this as he stated that the degree of support by the tutor was closely correlated with the student's benefit (Symons & Galpin, 1998).

Computer Mediated Communication

There is an abundance of literature on the use of computer mediated communication (CMC) for learning, and on its potential especially in promoting collaborative learning (Warschauer, M. 1997). Bernard et al. (2000) found that CM communication can improve the productivity of collaborative groups. Komito (1998) also stated that electronic/computer mediated environments support virtual communities. In this study the following specific factors emerged in terms of CMC: efficient use of CMC tools (e-mail, forum, chat) for sharing ideas; uninterruptible communication to compensating for the lack of social context, for online discussions, and for making quick decisions.

Group Work

A collaborative activity must take account of the level of group work skills within the group, and the task must be carefully specified to support motivation and group focus (McAlister, 2001). The results indicated the following specific factors in terms of group work: appropriate group size (5 or 6); group projects; enjoyable online arguments and discussions; and leadership.

Learning environment characteristics

The study revealed the following factors for the structure of an online learning environment to facilitate meaningful collaborative learning: the increased interactivity between learners and the instructor; easy access to extensive resources; emphasis on interpersonal communication skills; a framework based on the theory of constructivism fostering project-based collaborative learning and providing shared space for working productively to encourage collaboration. As stated by Duffy & Jonassen (1991) and Collins et al(1996), debates, discussion and negotiation help learners construct knowledge by sharing their ideas.

Instructor roles

According to the results of previous studies, students' success and satisfaction in online learning environments are related to the changing role of the instructor from being a leader to that of a facilitator or moderator (Markauskaitè, 2003; Kanuka & Anderson,

1999; Symons & Galpin, 1998; Collins & Berge, 1996). In this study it is found that CSIT444 lessons fit into the Collins and Berge (1996) analysis according to which in order to ensure the success of managing any web-based learning environment, there needs to be a shift from the traditional teaching role of the instructor to an online facilitator; and for the student from a traditional role to an online learner.

This study suggested a number of factors in terms of pedagogical, social, managerial, and technical aspects of the instructor's role as a facilitator.

The factors related to pedagogical aspects are: enabling the exchange of ideas quickly through online collaboration tools to create a meaningful collaborative learning environment; being aware of the drawbacks likely to occur in an online environment and to know how to handle them; and the utmost importance of being constantly present in the online environment in order to compensate for the absence of face-to-face interaction.

As for the factors regarding the social aspects we can list the followings: providing a social context by encouraging students to interact via e-mail, discussion forum and chat tools; creating a sense of community through group chat and discussions and creating a friendly environment in which learning is promoted.

We could list the factors related to managerial aspects in the following way: planning and organizing the resources, activities, discussions, and group projects carefully, and facilitating them with a clear guidance; managing communication, collaboration, and coordination for the group work through a network where a three-way interaction among the instructor, students, and external resources takes place.

The factors in terms of technical aspects are: being proficient and comfortable with using the technology and paying attention to overcome the technical problems that would occur. Collins and Berge (1996) also considered that instructors or facilitators in an online learning environment must first become comfortable and proficient with the technology to ensure the comfort of the learners.

Table 6.1. The factors that contribute to collaboration via CMC in the web-based course

	Activities
Perceived benefits	• making students understand things from different perspectives • providing opportunities for learning together • improvement of the interpersonal skills • a better understanding for the subject matter and the topics • endowment with better skills • professional growth • socialization • flexibility and convenience • encouragement of individual/self-directed learning
Motivation	• using the CMC tools • working as a team • appreciating the mood of the team • enjoyment • reliable technology • good designed course website
Learner support	• adequate resources • easy access • immediate feedback through CMC • flexibility • face to face session at the first meeting • a course assistant as a tutor
CMC	• efficient use of CMC tools (e-mail, forum, chat) for sharing ideas • uninterruptible communication to compensating for the lack of social context for online discussions, and for making quick decisions
Group work	• appropriate group size (5 or 6) • group projects • enjoyable online arguments and discussions • leadership
Learning environment characteristics	• the increased interactivity between learners and the instructor • easy access to extensive resources • emphasis on interpersonal communication skills • a framework based on the theory of constructivism fostering project-based collaborative learning • providing shared space for working productively to encourage collaboration
Instructor roles	pedagogical aspects: • enabling the exchange of ideas quickly through online collaboration tools to create a meaningful collaborative learning environment • being aware of the drawbacks likely to occur in an online environment and to know how to handle them • being constantly present in the online environment in order to compensate for the absence of face-to-face interaction social aspects: • providing a social context by encouraging students to interact via e-mail, discussion forum and chat tools • creating a sense of community through group chat and discussions • creating a friendly environment in which learning is promoted managerial aspects: • planning and organizing the resources, activities, discussions, and group projects carefully, and facilitating them with a clear guidance • managing communication, collaboration, and coordination for the group work through a network where a three-way interaction among the instructor, students, and external resources takes place technical aspects: • being proficient and comfortable with using the technology • paying attention to overcome the technical problems that would occur

Hopefully, the above mentioned factors of seven categories presented in the Table 6.1 will provide a better understanding of what the essential characteristic of such a learning and teaching mode should be. By considering these factors, it is also hoped that the result will yield better solutions in terms of the concepts and practices of providing meaningful online learning experiences.

6.3 Implications for practice

The proliferation of information and communication technology introduced many opportunities for distance learning and education. The advent of computer networks has changed the role of the computer in the classroom by enabling collaborative learning strategies. Thus, the computer has become a medium that restructures the interaction among participants (Kern, 1996, cited in Heift & Caws 2000).

Collaborative learning itself in traditional learning environments is already known to be enhancing learning. Students in the online learning environment are also expected to learn collaboratively and cooperatively (Palloff & Pratt, 1999). Therefore, it is quite inevitable to provide opportunities for collaborative learning in online learning environments.

Within a context of rapid technological change and shifting market conditions, education system is challenged with having to provide increased educational opportunities for a large numbers of students without increased budgets. Many educational institutions are trying to answer this challenge by offering distance education programs based on developing information communication technologies. Such programs can provide various educational opportunities not only for young students but also for adults regarding their life long learning and workplace learning needs. Hence, institutions continue to increase the number of the web-based course offerings.

The speed of competition in the area of online education is forcing the educational institutions to research for better, more powerful and richer online learning

environments. Many educators ask if distant students learn as much as students receiving traditional face-to-face instruction. Research comparing distance education to traditional face-to-face instruction indicates that teaching and studying at a distance can be as effective as traditional instruction when the method and technologies used are appropriate to the instructional tasks, where there is student-to-student interaction, and when there is timely teacher-to- student feedback (Moore & Thompson, 1990).

The important point, then, is to construct the necessary structures and methodologies to facilitate collaborative activities in online learning environments. In order to manage this it is necessary to examine the existing online learning environments and to seek feedback from the students. Previous research studies mostly focused on the effectiveness of online courses in terms of academic achievement. More research is needed in terms of student satisfaction to explore the necessary framework that will respond effectively to learner needs. Especially the perceptions about the online courses must be identified in terms of several aspects.

The major findings of this study indicated that both the students and the instructor perceived the online collaborative learning/teaching experience positively and they reported that it was a beneficial, motivating experience with the availability of group work, CMC, and adequate support structure. However, some students suggested a face- to -face session as the first meeting at the beginning of the semester so that they can meet the instructor physically and have introductory information about the structure of the course, and features of the course web site. This recommendation is one of the critical issues as the online instruction is a new concept for most of the students to get used to. Furthermore, the results also suggested a number of influential factors under seven major categories implying promoted learner benefits, increased motivational factors, satisfactory learner support structure, supplied CMC with reliable technology, interactive learning environment providing rich resources, and instructor role as a facilitator managing communication, collaboration, and coordination for the group work. The study attempted to discuss these factors generated from the participants' perceptions to predict the utility of online learning

in future applications. In other words if these factors are present in an online environment, it means that the student's needs are being met. The suggested factors are thought to be useful guidelines for those planning to offer online courses. Practitioners who plan to use CMC as part of their online teaching strategies should consider these factors when designing web-based courses. Understanding these factors that contributed to collaboration via CMC in a web-based course will be very beneficial also for the successful integration of technology into education.

The higher education system in Turkey has to respond to numerous problems challenges, and changing needs of the society. Yıldırım, S. & et al (2001) recommended effective in-service training programs and technology integration strategies for the teachers in their study. Furthermore, in spite of economic problems and various restrictions, the big demand for the higher education is creating a pressure on the universities in Turkey to enroll larger numbers of students every year. Distance education and training may be a response to the problems and challenges confronting the Turkish higher education institutions, their teaching staff and students. The circumstances are especially conducive to the development of distance education programs and even to the development of the virtual universities. In order to successfully tackle the issues in distance education, there is a need for different online course models and frameworks for different purposes and needs.

The conclusions based on the results of the study will be helpful to provide a basis for designing online courses in general and also provide some important factors that will contribute to the development of the framework for the evaluation of online learning environments. Knowing what factors influence a student's satisfaction in an online course can increase the expansion of this type of instruction, increase an institution's student population, provide new opportunities of access to underserved student populations and improve an institution's online course reputation.

As a conclusion, it is hoped that this case study has added to the relevant literature with a significant number of results and recommendations.

6.4 Recommendations for further research

"As new technologies become more commonplace in the support of instruction, new questions are being raised concerning the effectiveness of traditional pedagogical methods and learning environments. Traditionally, distance education became synonymous with correspondence courses. Today, however, the designer of online learning programs has a myriad of choices ranging from synchronous to asynchronous delivery systems. In addition, research on the effects of distance learning systems has consistently focused on student outcomes. Given the complexities of online education, research into this new domain of instructional delivery should take a variety of forms and seek to answer a wide range of questions" (Ahern & Repman, 1994, p. 537). This implies the need for further research on different aspects of online education regarding supply and demand for studies and courses in this field. Future research studies combining both quantitative and qualitative approaches will help finding the answers for questions related to technology integration and suitable methodologies for developing successful online learning environments.

This present research study utilized a combination of both quantitative and qualitative data to investigate both the students' and the instructors' perceptions about the impact and the potential of the online learning environment CSIT 444 as one educational setting in terms of some limited aspects including learner benefits, learner support, motivation, computer mediated communication (CMC), and group work. The information obtained from the conclusions is rich and reflects the experiences of the participants in this case study, but still a lot of unanswered questions are left for further research that will examine more online educational settings in terms of other aspects to explore the perceptions and satisfaction levels of participants with a different profile. In addition, a longitudinal study involving more semesters may produce valuable and interesting data. It would, in particular, be important to know how instructors' contentment has changed as they gained more experience with online teaching, since they first started as beginners and then became

experts in the course of time. It is hoped that more researchers will be instigated by this study to follow its recommendations.

Similar future research studies applying different methodologies are recommended on different online courses in a wide range of different institutions of higher education to explore both students' and instructors' perceptions about the online learning environment in order to provide valuable outcomes that could be beneficial for improving web course design and support structure for the programs engaged in online courses.

Comparative studies between different institutions are also recommended to determine the variables that may account for differences between institutions, which will produce results to shed some light on issues for the curriculum development of interdisciplinary online programs.

The conclusions were discussed thematically within the context of this research study and represented outlying themes to propose a list of factors that contribute to collaboration via CMC in a web-based course. After a multi-level process, the conclusions drawn from this study led to the emergence of a series of factors under seven major categories. A further longitudinal study with a broader perspective is recommended for understanding the factors that support communication in virtual learning environments for computer-supported collaborative learning.

Further research is also recommended to combine these factors to design a new online learning environment evaluation instrument which will assess student perceptions about the suggested major characteristics of online learning environments. The development of such an instrument to capture students' perception of web based learning environment will allow researchers and online course developers to evaluate the appropriateness of an online learning environment.

After continuous evaluation, refinement, and attention researchers will have a chance to understand the use of the Web as a learning environment in order to develop

online learning and teaching models for online courses, and specify the criteria for evaluation of the online learning environment in terms of its essential components for desired outcomes.

To conclude, more research is recommended to extend the resources for developing ICT and the internet technologies for and to specify how these technologies can be used in online educational settings to maximize learning. To conclude, more research is suggested to extend the resources for developing ICT and the internet technologies for determining how these technologies can be used in online educational settings to maximize learning. When it comes to what could be done in our country in order to promote the evolution of web-based distance education, the best thing to do would be to gather all the research done in this field in the form of a non-profit national consortium. The development of such a consortium connected to international associations and organizations specialized in distance education will be very beneficial in terms of creating synergy through collaboration and cooperation which would lead to a quick and correct decision making mechanism on distance education policies. As stated by Turoff (2000) "Only consortiums based on real cooperation among the participating institutions will succeed" p.3. With the effective collaboration inspired by the consortium, it will be possible to define the role of the private sector and the government in distance education, and in the light of the national policies to be formed by the consortium the proposed projects will turn into successful practices. Thus, the united forces formed by the consortium will play a significant role for us to compete and have a say on the international platform in distance education.

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APPENDIX A

Online Collaborative Learning Evaluation Questionnaire (OCLEQ)

Please answer the questions about the CSIT444.
Use the mouse to click on the "circle" in the column that indicates the level you agree or disagree with the ideas expressed. If you make a mistake, click on the correct choice and the previous choice will disappear. When you finish, press the **Send** button in the end of the page.
SD - Strongly Disagree, **D** - Disagree, **N** - Neutral, **A** - Agree, **SA** - Strongly Agree

		SA	A	N	D	SD
1	The resources in order to search for answers for my questions were adequate.	○	○	○	○	○
2	The forum was very beneficial to understand each other's ideas.	○	○	○	○	○
3	I used the chat very frequently to communicate with the other group members.	○	○	○	○	○
4	I had no difficulties in accessing the web site of the course.	○	○	○	○	○
5	I was able to receive immediate feedback through chats and forums.	○	○	○	○	○
6	The forum and chats increased my motivation towards the subject.	○	○	○	○	○
7	Working as a team increased my motivation towards the subject.	○	○	○	○	○
8	The mood of the team encouraged hard work for everybody.	○	○	○	○	○
9	The number of people in my group was appropriate.	○	○	○	○	○
10	I enjoyed working with my teammates.	○	○	○	○	○
11	We could not accomplish this project unless we worked together.	○	○	○	○	○
12	Working as a team made me understand things from different perspectives.	○	○	○	○	○
13	Learning together was very beneficial to me.	○	○	○	○	○
14	Working as a team improved my interpersonal skills.	○	○	○	○	○

15	I understand the subject matter better working with teammates.					
16	The arguments in the group were fruitful.					
17	On many instances it was easy to conduct an online discussion.					
18	The group leader did a well job on summarizing things and scheduling.					
19	I would rather work alone for this project.					
20	Chats and forums improved my understanding of the topic.					
21	I was endowed with better skills to create a pleasing web site.					
22	The absence of social context did not effect me negatively to work on the project.					
23	All group members participated in online discussions equally.					
24	As a group, we did not have any communication delay.					
25	It did not take too much time to make decisions on the project through online communication.					
26	Working on the project through online communication helped my professional growth.					
27	Flexibility in time made me to work effectively.					
28	Working on the project through online communication socialized me.					
	Please Type Your Additional Comments on This Site, in the Following Box.					

APPENDIX B

Reliability Analysis - Scale (ALPHA)

		Mean	Std Dev	Cases
1.	COLQ1	4,4343	,7071	175,0
2.	COLQ2	4,3143	,7339	175,0
3.	COLQ3	3,7829	1,0220	175,0
4.	COLQ4	4,0343	1,0822	175,0
5.	COLQ5	4,3200	,7734	175,0
6.	COLQ6	4,1086	,9189	175,0
7.	COLQ7	4,2629	,8641	175,0
8.	COLQ8	4,1600	,8955	175,0
9.	COLQ9	4,3429	,7635	175,0
10.	COLQ10	4,4457	,8278	175,0
11.	COLQ11	3,9371	1,0458	175,0
12.	COLQ12	4,3086	,8819	175,0
13.	COLQ13	4,3600	,8106	175,0
14.	COLQ14	4,2686	,8788	175,0
15.	COLQ15	4,3143	,8896	175,0
16.	COLQ16	4,2000	,8235	175,0
17.	COLQ17	4,0800	1,0139	175,0
18.	COLQ18	4,4000	,8776	175,0
19.	COLQ19	3,4171	1,3741	175,0
20.	COLQ20	4,1657	,9832	175,0
21.	COLQ21	4,3486	,7495	175,0
22.	COLQ22	3,9886	,9528	175,0
23.	COLQ23	3,9600	1,1057	175,0
24.	COLQ24	3,9200	1,1419	175,0
25.	COLQ25	3,9829	,9497	175,0
26.	COLQ26	4,2629	,8641	175,0
27.	COLQ27	4,3943	,7944	175,0
28.	COLQ28	4,2057	,9547	175,0

Statistics for	Mean	Variance	Std Dev	N of Variables
SCALE	116,7200	212,2143	14,5676	28

Item-total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
COLQ1	112,2857	202,9179	,4367	,9176
COLQ2	112,4057	201,6908	,4790	,9170
COLQ3	112,9371	196,8064	,5009	,9167
COLQ4	112,6857	201,9754	,2948	,9204
COLQ5	112,4000	200,9770	,4852	,9169
COLQ6	112,6114	199,5033	,4571	,9173
COLQ7	112,4571	196,0197	,6385	,9146
COLQ8	112,5600	197,4777	,5537	,9158
COLQ9	112,3771	200,1903	,5296	,9163
COLQ10	112,2743	196,5565	,6451	,9146
COLQ11	112,7829	197,7802	,4535	,9175
COLQ12	112,4114	199,1976	,4916	,9168
COLQ13	112,3600	196,3811	,6680	,9144
COLQ14	112,4514	193,7893	,7215	,9133
COLQ15	112,4057	196,2080	,6105	,9150
COLQ16	112,5200	198,4234	,5652	,9158
COLQ17	112,6400	193,9789	,6093	,9148
COLQ18	112,3200	200,3798	,4453	,9174
COLQ19	113,3029	205,7181	,1169	,9262
COLQ20	112,5543	195,0071	,5914	,9151
COLQ21	112,3714	199,7406	,5623	,9160
COLQ22	112,7314	196,2435	,5642	,9156
COLQ23	112,7600	194,7926	,5249	,9164
COLQ24	112,8000	191,6322	,6098	,9148
COLQ25	112,7371	197,4592	,5190	,9163
COLQ26	112,4571	196,0657	,6365	,9146
COLQ27	112,3257	198,5657	,5815	,9156
COLQ28	112,5143	196,2167	,5640	,9156

Reliability Coefficients

N of Cases = 175,0 N of Items = 28

Alpha = ,9191

APPENDIX C

Factor Analysis

Communalities

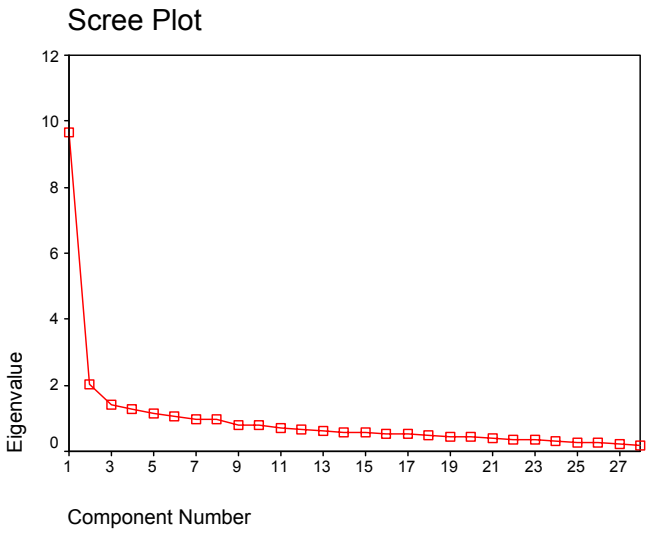
	Initial	Extraction
COLQ1	1,000	,541
COLQ2	1,000	,549
COLQ3	1,000	,339
COLQ4	1,000	,265
COLQ5	1,000	,599
COLQ6	1,000	,601
COLQ7	1,000	,617
COLQ8	1,000	,474
COLQ9	1,000	,586
COLQ10	1,000	,637
COLQ11	1,000	,544
COLQ12	1,000	,521
COLQ13	1,000	,698
COLQ14	1,000	,683
COLQ15	1,000	,591
COLQ16	1,000	,509
COLQ17	1,000	,584
COLQ18	1,000	,503
COLQ19	1,000	,647
COLQ20	1,000	,648
COLQ21	1,000	,566
COLQ22	1,000	,571
COLQ23	1,000	,573
COLQ24	1,000	,534
COLQ25	1,000	,445
COLQ26	1,000	,579
COLQ27	1,000	,553
COLQ28	1,000	,605

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9,674	34,548	34,548	9,674	34,548	34,548	5,083	18,152	18,152
2	2,038	7,277	41,825	2,038	7,277	41,825	3,886	13,877	32,029
3	1,425	5,090	46,915	1,425	5,090	46,915	3,500	12,500	44,529
4	1,289	4,605	51,521	1,289	4,605	51,521	1,565	5,590	50,119
5	1,136	4,057	55,578	1,136	4,057	55,578	1,528	5,459	55,578
6	1,062	3,794	59,372						
7	,971	3,467	62,838						
8	,954	3,406	66,244						
9	,811	2,898	69,142						
10	,779	2,783	71,924						
11	,712	2,544	74,469						
12	,661	2,359	76,828						
13	,623	2,227	79,055						
14	,592	2,115	81,170						
15	,571	2,039	83,209						
16	,532	1,899	85,108						
17	,514	1,837	86,945						
18	,467	1,667	88,612						
19	,434	1,550	90,162						
20	,423	1,511	91,672						
21	,387	1,384	93,056						
22	,349	1,245	94,301						
23	,334	1,193	95,495						
24	,317	1,132	96,626						
25	,262	,936	97,562						
26	,257	,919	98,481						
27	,227	,811	99,292						
28	,198	,708	100,000						

Extraction Method: Principal Component Analysis.



Component Matrix[a]

	Component				
	1	2	3	4	5
COLQ14	,774	-3,38E-02	-,211	-,193	-2,38E-02
COLQ13	,728	-,303	-,256	4,346E-02	9,296E-02
COLQ10	,714	-,338	-5,99E-02	-1,35E-02	-9,64E-02
COLQ7	,704	-,314	-,123	7,955E-02	3,168E-02
COLQ26	,678	,136	,154	-,277	-1,21E-02
COLQ15	,676	-,200	-,161	-,188	-,180
COLQ24	,652	-7,43E-02	,299	5,541E-02	-,102
COLQ17	,647	,184	,212	,107	-,275
COLQ27	,626	,137	,236	-,225	-,190
COLQ20	,624	,391	-,314	2,524E-03	8,469E-02
COLQ8	,618	-,215	-,200	-3,58E-02	-7,51E-02
COLQ16	,611	-,263	8,224E-02	-5,39E-02	,239
COLQ28	,597	,326	5,383E-02	-,358	,104
COLQ22	,594	7,226E-02	,390	1,063E-02	,245
COLQ21	,593	,251	1,882E-02	,374	-,109
COLQ9	,585	-,309	-5,80E-02	,379	4,705E-02
COLQ23	,578	-,229	,426	-2,31E-02	6,676E-02
COLQ12	,561	-,336	-,190	2,844E-02	,236
COLQ25	,552	,141	,338	-7,68E-02	-2,20E-02
COLQ3	,533	7,926E-02	,191	-8,43E-02	7,206E-02
COLQ5	,523	,273	-,200	,309	-,338
COLQ2	,523	,350	-,233	-,121	-,291
COLQ11	,502	-2,54E-02	-,200	-,319	,387
COLQ18	,495	-,220	4,491E-03	,420	-,182
COLQ1	,462	,222	-,166	,299	,403
COLQ19	,114	,547	9,678E-02	,364	,439
COLQ6	,483	,539	-,260	-8,74E-02	-5,38E-02
COLQ4	,314	3,608E-02	,381	,133	-4,71E-02

Extraction Method: Principal Component Analysis.

a. 5 components extracted.

Rotated Component Matrix[a]

	Component				
	1	2	3	4	5
COLQ13	,776	,159	,220	,132	6,406E-02
COLQ7	,703	,250	,153	,192	2,300E-02
COLQ12	,699	,122	5,307E-02	7,882E-03	,119
COLQ10	,669	,319	,184	,193	-,128
COLQ9	,600	,197	-2,49E-02	,400	,165
COLQ14	,595	,273	,503	1,069E-02	-1,02E-02
COLQ8	,588	,163	,276	,140	-7,46E-02
COLQ16	,585	,390	3,223E-02	-5,01E-02	,108
COLQ15	,578	,250	,377	8,857E-02	-,213
COLQ11	,511	,151	,287	-,376	,191
COLQ23	,371	,653	-6,41E-02	6,633E-02	-5,67E-03
COLQ22	,252	,649	8,462E-02	-1,27E-02	,281
COLQ25	,138	,600	,240	5,775E-02	7,249E-02
COLQ24	,330	,590	,150	,234	-2,64E-03
COLQ27	,185	,578	,412	4,768E-02	-,110
COLQ26	,294	,545	,433	-8,46E-02	4,358E-03
COLQ17	,157	,527	,386	,365	1,839E-02
COLQ4	2,521E-02	,468	-1,59E-02	,197	7,476E-02
COLQ3	,241	,466	,227	-4,49E-03	,113
COLQ6	6,346E-02	,100	,726	3,906E-02	,243
COLQ2	,138	,137	,697	,159	-2,82E-02
COLQ20	,300	,109	,652	6,424E-02	,343
COLQ28	,191	,443	,547	-,237	,128
COLQ18	,407	,200	1,964E-02	,543	4,427E-02
COLQ5	,161	9,795E-02	,516	,533	,114
COLQ21	,192	,305	,351	,470	,302
COLQ19	-,196	,128	,114	5,149E-02	,759
COLQ1	,320	8,792E-02	,215	9,528E-02	,613

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Component Transformation Matrix

Component	1	2	3	4	5
1	,646	,546	,476	,197	,140
2	-,618	,071	,636	-,027	,456
3	-,375	,823	-,424	,006	-,045
4	-,005	-,140	-,309	,801	,494
5	,244	-,003	-,307	-,565	,726

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

APPENDIX D

Questionnaire Categories Concerning Student Perceptions

	Categories	Item Number
1	Learner benefits	12, 13, 14, 15, 20, 21, 26, 28
2	Motivation	6, 7, 8, 10
3	Learner support	1, 4, 5, 27
4	Computer Mediated Communication	2, 3, 22, 23, 24, 25
5	Group work	9, 11, 16, 17, 18, 19

APPENDIX E

Data Coding Guide for Quantitative Analysis

Variable Name	Description / Code
Gender	1 = Male 2 = Female
Semester	1 = Fall 2002 semester 2 = Spring 2002 semester 3 = Fall 2003 semester
Items in the Questionnaire Q1-Q28	Perception Indicator Items, Five-point Likert type , 1-5 (1 = Strongly disagree to 5 = Strongly agree)

APPENDIX F

The Themes Emerged From the Responses to the Open-Ended Item

	Themes	Frequency
1	individual learning/more responsible/regular study/more research/more time for the course	24
2	flexibility (time) /gained time/more time to study and project work/cheaper	8
3	connection problems/problems with chat/non-university account/we had to come to university though online	23
4	enjoyable learning	21
5	sufficient course content (learned the basics)	5
6	chat and forum are very efficient/useful	6
7	course web site structure and interface design problematic	1
8	up to date technology for learning	3
9	beneficial site for communication and using other sites	1
10	online instruction was a new concept and difficult to get used to	16
11	chat sessions with the instructor were not enough (course hours)	3
12	lost something in subjects	1
13	homework too easy	1
14	it was good that the course was online	21
15	easy access to lecture notes and instructor for questions any time	13
16	group work made me aware of some of my characteristics	2
17	group work helped me learn about the kind of problems in such work	2
18	useful course	16
19	the instructor should have made the necessary explanations/possible difficulties at the beg.	5
20	couldn't submit homework	1
21	very good page design	3
22	perfect site	9
23	forum was beneficial (find the answer to every question)	2
24	projects should have been individual (everyone has a different working style)	1
25	homework and online documentation were the best	1
26	browsing the page (chat, forum) impossible when out of university	4
27	I don't like group work we can't meet	1
28	a follow-up course would be good	3
29	I made my own webpage	6
30	complex website	1
31	html webpage is easy and we can correct mistakes	2
32	better to meet the instructor face to face	10
33	more lecture notes needed	1
34	more self-study parts needed	1

35	we didn't use group chat often preferred face-to-face/and they are my real friends	4
36	learned a lot about web design	19
37	easier concentration because it was online	1
38	misunderstandings in chat	1
39	definitely need an assistant for this online course , assistant could be more helpful)	4
40	I am lucky/happy to have taken such a course	8
41	chat and forum are not useful for group work	1
42	we should have taken this course in the previous years, difficult for a 4th year/should've learned earlier	5
43	I could have learned more if the course hadn't been online	2
44	Second project was better as we all did something as a group	1
45	I learned html well	3
46	we have taken a web course for the first time	2
47	I was worried that it was online	2
48	the online course can be combined with 2 hours of lecture	2
49	we don't have a sufficient number of computers/labs/no access to computer at home	1
50	we always met as a group (in spite of chat and forum)	3
51	I was very pleased with my group members and group work (we met)	2
52	I felt like a real university student with this online course	2
53	communication through only chat and forum was hard for me	1
54	arranging the chat time was difficult	1
55	this course made me more creative	1
56	you could use your video for each conference	1
57	Thought online course would give less content (no teacher) realised that didn't need the teacher for that	1
58	I learned a lot from group work	13
59	when we cant log off the new user seems to be online in forum (technical problem)	1
60	I had no time for group chat because of too many projects	2
61	we are not ready for this course as we like chatting (culturally), 30 passes to get organized	1
62	group evaluation won't be fair	2
63	in forum my friends sent unimportant messages for extra points	1
64	evaluation: if I have no questions via mail and forum I will get less points	1
65	we need more application/chat not enough for learning html	2
66	chat sessions could have been better (using voice chat/net meeting while giving the topic)	2

APPENDIX G

Organized Form of the Emerged Themes

1. The online course increased students' motivation. (73)

Enjoyable learning	21
It was good that the course was online (21), I am lucky/happy to have taken such a course (8), I felt like a real university student with this online course (2)	31
The course site was perfect (9), Very good page design (3) , Up to date technology for learning (3)	15
Encouraged to develop my own webpage	6

2. The course met its objectives. (56)

I learned a lot about web design (22), Useful course (16) I made my own webpage (6)	44
Sufficient course content (I learned the basics)	5
We have learned together by completing the group project	7

3. The online course was flexible and convenient for most learners. (42)

course offering as online was very beneficial in terms of flexibility and convenience	21
I had easy access to lecture notes and instructor for questions any time	13
Course hours were flexible so I gained time to study	8

4. The course encouraged individual/self-directed learning. (34)

I felt more responsible for my own learning and studied regularly	24
I did more research and spent more time to study and for project work	8
this course made me more creative	1
easier concentration because it was online	1

5. CMC was useful in enhancing students' collaboration. (8)

Chat and forum are very efficient/useful	8

6. Students' perceptions on the use of group work (10)

I learned a lot from group work , group work made me aware of some of my characteristics (2) I was very pleased with my group members and group work (2) Group work helped me learn about the kind of problems in such work (2)	6
I had no time for group chat because of too many assignments (2), projects should have been individual everyone has a different working style (1), it was difficult to meet with group members	4

7. For some students online instruction was a new concept to get used to and they preferred face-to-face interaction to online communication. (47)

Online instruction was a new concept and difficult to get used to	17
It is better to meet the instructor face to face	10
The instructor should have made the necessary explanations at the beginning of the term	5
We didn't use group chat often preferred face-to-face communication as they are my real friends	7
I could have learned more if the course hadn't been online	3
At first I was worried that it was online	2
The online course can be combined with 2 hours of lecture	2
you could use your video for each conference	1

8. Difficulties and problems involved in an online course (20)

course web site structure and interface design problematic	1
chat sessions with the instructor were not enough (course hours)	3
projects should have been individual (everyone has a different working style)	1
I don't like group work we can't meet	1
more self-study parts needed	1
misunderstandings in chat	1
definitely need an assistant for this online course	2
I was worried that it was online	2
arranging the chat time was difficult	1
we are not ready for this course as we like chatting (culturally), 30 passes to get organized	1
in forum my friends sent unimportant messages for extra points	1
evaluation: if I have no questions via mail and forum I will get less points	1
we need more application/chat not enough for learning html	2
chat sessions could have been better (using voice chat/net meeting while giving the topic)	2

9. Technical problems were demotivating for students. (33)

Connection problems	23
Browsing the page (chat, forum) impossible when out of university	4
When we cant log off the new user seems to be online in forum (technical problem)	1
I couldn't submit my homework	1
Complex website	1
We don't have a sufficient number of computers and no access to computer at home	1
couldn't submit homework	1

10. Some students did not feel at ease using CMC. (6)

We definitely need an assistant for this online course	4
Chat and forum are not useful for group work	1
communication through only chat and forum was hard for me	1

APPENDIX H

The Informal Interview Questions

- Neden web-tabanlı ders vermek istediniz?
- Öğretim yönteminizi çevrimiçi derse nasıl adapte ettiniz?
- Bu dersteki emek ve çabanızı geleneksel yöntemlerle verdiğiniz derslerle iş yükü açısından ne şekilde karşılaştırıyorsunuz?
- Derste kullandığınız bilgisayar destekli iletişim teknolojileri (e-mail, forum ve chat) ile ilgili deneyimlerinizi anlatır mısınız?
- Çevrimiçi dersinizde kullandığınız bilgisayar destekli iletişim teknolojilerinin avantajları ve dezavantajları nelerdir?
- Çevrimiçi öğretim deneyimlerinizin en çok beğendiğiniz/hoşlandığınız yönleri nelerdi?
- Çevrimiçi öğretim deneyimlerinizin en az beğendiğiniz/hoşlanmadığınız yönleri nelerdi?
- Çevrimiçi ders geliştirme ve ders verme ile ilgili olarak genelde neler önerirsiniz?
- Çevrimiçi derslerde öğrencilere sağlamaya çalıştığınız kazançlar nelerdir?
- Dersinizde öğrencileri motive edici ne gibi unsurlara yer verdiniz?
- Dersinizde yer verdiğiniz destekleyici unsurlar ve kaynaklar nelerdir?
- Çevrimiçi ortamda proje tabanlı grup çalışması hakkında ne düşünüyorsunuz?
- Dersinizde yaşadığınız problem ve aksaklıkları anlatır mısınız?
- Dersinizde karşılaştığınız problem ve aksaklıkları ne şekilde gidermeye çalıştınız ve daha sonrasında ne tür önlemler aldınız?
- Bu dersi verirken nasıl bir rol üstlendiniz?
- Öğrencilerin dersteki başarılarını ne şekilde değerlendiriyorsunuz.?
- Dersinizde çevrimiçi dayanışmaya etki eden faktörler sizce neler olmuştur?
- Dersinizin güçlü ve zayıf yanları nelerdir?
- Çevrimiçi öğretim deneyiminizden ne kadar memnun kaldınız?

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