M .S. AZGUR

AN ANALYSIS OF STUDENT PERCEPTIONS AND TEACHER INTENTIONS OF BLENDED LEARNING IN COMPUTER AND INSTRUCTIONAL TECHNOLOGY TEACHER EDUCATION PROGRAM

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AN ANALYSIS OF STUDENT PERCEPTIONS AND TEACHER INTENTIONS OF BLENDED LEARNING IN COMPUTER AND INSTRUCTIONAL TECHNOLOGY TEACHER EDUCATION PROGRAM

A Master's Thesis

by

MEHMET SERHAT AZGUR

THE PROGRAM OF CURRICULUM AND INSTRUCTION

BILKENT UNIVERSITY

ANKARA

April 2011

To my children Ayşe Hande and Ahmet Murathan

AN ANALYSIS OF STUDENT PERCEPTIONS AND TEACHER INTENTIONS OF BLENDED LEARNING IN COMPUTER AND INSTRUCTIONAL TECHNOLOGY TEACHER EDUCATION PROGRAM

The Graduate School of Education

of

Bilkent University

by

MEHMET SERHAT AZGUR

In Partial Fulfillment of the Requirements for the Degree of

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I certify that I have read this thesis and have found that it is fully adequate, in scope and in quality, as a thesis for the degree of Master of Arts in Curriculum and Instruction.

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ABSTRACT

AN ANALYSIS OF STUDENT PERCEPTIONS AND TEACHER INTENTIONS OF BLENDED LEARNING IN COMPUTER AND INSTRUCTIONAL TECHNOLOGY TEACHER EDUCATION PROGRAM

Mehmet Serhat Azgur

M.A. Program in Curriculum and Instruction

Supervisor: Assoc. Prof. Dr. Cengiz Alacacı

April 2011

One of the key concerns of teacher education is to facilitate the development of the teaching talents of pre-service teachers with scaling technologies and pedagogy of the 21st Century. Teacher educators also need to enhance pre-service teachers' curriculum by modeling good teaching methods.

This study explored another side of blended learning methods and tried to uncover students' perceptions of what their instructors are practicing. Social relations that are created by blended learning methods are also explored.

Instructors of Computer and Instructional Technology Teacher Education Department (CTE) and their respective students were participants in the study to investigate the departmental use of blended learning methods. Total of 44 students and 12 teachers participated in the study. Only students of preparatory school and freshmen are not included because of their lack of sufficient number of courses where blended

learning methods are used. Data collection tools in the research included interviews and questionnaires aimed to assess students' perception of blended learning methods together with the interviews and questionnaires of the instructors of the CTE Department in order to understand what blended learning methods were practiced.

The data collected from both interviews and questionnaires were analyzed using qualitative and quantitative techniques.

The findings revealed that although 4th and 5th year students are aware of the different applications of blended learning and the intentions of teachers who used this approach, we cannot generalize and say the same for all CTE students. Yet another finding is that participants thought that Learning Management Systems (LMS) improve the student-to-student and teacher-to-student relations in instructional settings. Additionally, the majority of the students think that computer literacy affects the success of blended learning applications unlike the beliefs of instructors.

Key words: Blended learning, teaching/learning methods, teacher education, pre-service teachers, social relations, Learning Management Systems.

ÖZ

BİLGİSAYAR VE ÖĞRETİM TEKNOLOJİLERİ ÖĞRETMENLİĞİ BÖLÜMÜNDE ÖĞRETİM ELEMANLARI TARAFINDAN KULLANILAN HARMANLANMIŞ ÖĞRETİMİN AMAÇLARI VE ÖĞRENCİ ALGILARININ BİR İNCELEMESİ

Mehmet Serhat Azgur

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Günümüzde, öğretmenlik eğitiminin temel amaçlarından birisi teknoloji kullanımını 21. yüzyılın pedagoji bilgileri ile birleştirerek hizmet öncesi öğretmenlerin öğretim yeteneklerini geliştirmektir. Öğretmen eğitimcilerinin de hizmet öncesi öğretmen müfredatını etkin öğretim yöntemleri ile zenginleştirme ve geliştirmeleri gerekir.

Bu çalışmada, harmanlanmış öğrenme (blended learning) yöntemlerine farklı bir açıdan yaklaşarak öğrencilerin öğretim uygulamaları ile ilgili algılamalarının neler olduğu bulunmaya çalışıldı. Ayrıca harmanlanmış öğrenme yöntemleri ile ortaya çıkan sosyal ilişkiler incelenmiştir.

Bu çalışmanın katılımcıları Bilgisayar ve Öğretim Teknolojileri Öğretmenliği Bölümü (BÖTE) öğretim elemanları ve öğrencileridir. Bu çalışmaya toplam 44

öğrenci ve 12 öğretim görevlisi katılmıştır. İçeriğinde harmanlanmış öğrenme teknikler kullanılan yeterli sayıda ders almamış oldukları için hazırlık okulundaki öğrenciler ile birinci sınıf öğrencileri araştırmaya dahil edilmemiştir. Araştırmada veri toplama araçları olarak, CTE Bölümü öğretim görevlileri tarafından uygulanan harmanlanmış öğrenme yöntemlerinin neler olduğunu ve uygulanan harmanlanmış öğrenme yöntemlerinin öğrenciler tarafından nasıl algılandıklarının değerlendirilmesi için, mülakat ve anket yöntemleri kullanılmıştır. Mülakat ve anketlerden elde edilen veriler nitel ve nicel teknikler kullanılarak analiz edilmiştir.

Bulgular, 4üncü ve 5inci sınıf öğrencilerinin farklı "harmanlanmış öğrenme" uygulama ve bunları uygulayan öğretim elemanlarının amaçlarının neler olduğunun farkında olmalarına rağmen, bunun 2. ve 3. sınıf CTE öğrencileri için geçerli olmadığını gösterdi. Çalışma öğrenci ve öğretmenlerin, Öğrenme Yönetim Sistemleri (LMS)nin öğrenci-öğrenci ve öğrenci-öğretmen ilişkilerini olumlu etkilediğini düşündüklerini ortaya çıkartmıştır. Ayrıca çalışma, öğrencilerin çoğunluğunun, öğretim elemanlarının aksine, bilgisayar okuryazarlığının harmanlanmış öğrenme uygulamalarının başarısını pozitif anlamda etkilediğini düşündüklerini ortaya çıkarmıştır.

Keywords: Harmanlanmış Öğrenim, Eğitim/Öğrenim Metodları, Öğretmen Eğitimi, Öğretmen Adayları, Sosyal İlişkiler, Öğrenme Yönetim Sistemi.

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CHAPTER 1: INTRODUCTION

Introduction

An educational system is concerned with the question of "what should people learn?" and from the answer to this question "what should instruction attempt to teach?" is driven. Then, the next question of "how do we teach?" that most educational systems address may partially be derived from the answers to the first two questions. Although, in general, answers to these questions seem to be independent from the pedagogical approach of an instructor, in practice they are directly related to the techniques and methods used in an educational environment. While an educational system attempts to form a comprehensive view of what would be useful for an individual to learn, it also dictates how this information would practically be relayed to the learner.

Hence, the core of an educational system is that students and their instructors interact with each other within an instructional system to exchange information under certain methodological conditions. Therefore, in order for instructors and their students to teach/learn within an instructional system, they are required to learn the instructional methods that will empower them to manipulate that educational system. Eventually, the success of those methods and its users will depend upon the efficiency and effectiveness of the method, what it offers to its users, how it is applied and how users perceive it.

Choosing the right teaching/learning method can be a challenge. There are many instructional methods or techniques available to choose from throughout the

educational world today. How one can choose, what to choose, and how to apply the chosen method to the instruction are some essential questions to be answered.

On the other hand, Information and Communications Technologies (ICT) industry has advanced so rapidly that one can find this technology in almost every aspect of modern life. Field of education is not an exception. Effects of ICT can easily be seen in almost all phases of education as a tool of improving educational processes. Developments in ICT, use of computer networking, easy to use software applications and the rapid expansion of the World Wide Web, because of their low-cost and flexibility, have resulted in many potential benefits for education. Therefore, instructional design and delivery of courses to be taught with the help of computer-based tools and methods are increasing in popularity. Consequently, higher education has begun to change. Increasing number of research studies in blended learning methods is a good indicator of growing interests in this matter.

In the U.S.A., The National Research Council (NRC) (2001) has reported, “the basic teaching style in too many mathematics and science classes today remains essentially what it was two generations ago.” While optimistically seeing only two generations of the sameness, it can also be said that the observations of NRC implies a need to change the style of teaching and learning in fundamental ways. One would be hard pressed not to say that the situation in other countries of the World is not an exception and most of the instruction (face-to-face) is still the same since Aristotle. Hence, blended learning methods and ICT related application tools represent some feasible steps taken in the direction of change in the style of teaching & learning.

Today's students have been raised in a world of instant access to knowledge and information, a world of automation, remote controls, and simulation capabilities to

stimulate the mind. Although schools that are embedded in this technological culture and the education system are largely unchanged, students are already using various communication tools and online information sources with confidence. Another words, students are far more technologically skilled than the institutions and instructors that educate them.

Dependence on paper-based material, delivered by either face-to-face (F2F) and/or traditional mail as a communication tool, and using broadcasting and TV programs as delivery methods have been declining. Instead a new generation of computer-based technologies that combine text, audio and video on a single communication platform is increasingly being used. Hence, firstly, technology changes the way in which students and teachers exchange information. Secondly, this change forces the instructors to alter instructional designs and information delivery methods.

In order to improve the quality of educational outcomes, use of software tools, such as supporting instructional design with visual tools or with various course management systems (CMS), is gaining popularity within instructional design processes. Various visual models are being developed for supporting and enhancing the instructional design process in recent years (Botturi, 2004). The objective of these development efforts is to represent the instructional design as a sequence of steps or as a set of elements that characterize the educational process. Özçınar (2009) has recently offered a broader definition of the instructional design as the systematic development of instructional specifications, using learning and instructional theory derived from behavioral, cognitive and constructivist theories. It is the entire process of analysis of learning needs and goals and development of a delivery system to meet those needs, including development of instructional

materials and activities, together with the testing and evaluating of all instruction and learner activities. Meanwhile, the term instructional engineering (IE) is defined as a method that supports planning, analysis, design and delivery of a learning system, integrating the concepts, the processes and the principles of instructional design, software engineering, and cognitive science (Paquette, 2004). The main difference of what Özçınar offers and the instructional engineering is that instructional engineering is a methodology that includes software engineering to help to produce the specifications of a learning system. Although Özçınar's definition of instructional design is more recent and more comprehensive it lacks the required ICT component, which is rapidly becoming an indispensable part of any teaching/learning process.

By the same token, teaching/learning processes have become open to a wider audience with the advancements in ICT and Internet technologies. Which in turn, made instructional process more complex, sophisticated and more difficult to design, implement and administer. Learning methods like e-learning, online learning, blended learning, hybrid learning, integrated learning, multi-method learning, mixed mode learning, flexible learning, and learning systems like computer-based training (CBT), technology-enhanced learning (TEL), Internet-based training (IBT), web-based training (WBT), learning management system (LMS), course management system (CMS), learning content management system (LCMS), etc. are being used commonly and they already took their place in the educational and/or instructional dictionaries.

On the other hand, we know that successful use of technology in education depends on teachers' attitudes and acceptance of technology (Yuen & Ma, 2008). As Breen et

al. (2001) and Marriott et al. (2004) claimed that the actual formal use of information technology in undergraduate and graduate studies still remains inconsistent and varies significantly from individual courses to individual institutions (as cited in Yuen & MA, 2008).

Use of technology of course does not only involve the delivery of instruction but it also concerns with other related components from the beginning of the course design. There are various software tools available starting from course modeling and instructional design to the application and delivery. Scope of the present study however is restricted only to the delivery of a course content and its relation to the blended learning methodologies.

Blended learning methods and related technology certainly opens up possibilities for new ways of engagement between instructors and students as well as between students, and invites innovative pedagogical strategies. But, not all teachers are necessarily motivated to use it. Inclusion of new software tools that are helpful and easy to use will definitely encourage the rather hesitant teachers or unskilled instructors. Since, it is probably not possible to resist the upcoming of new ICT technologies, academicians are opt to follow the trend and make use of new affordances that are being made available for them. This researcher believes that afore-mentioned engagement process should start with the design of the course and continue with the delivery process by using new technological conveniences. As user-friendly software tools with better graphical interfaces are provided for educators, instructors will most likely get motivated and make use of the new and innovative blended learning facilities.

One of the main purposes of this study, therefore, is to explore whether the self-motivated teacher educators who use blended learning methods in certain courses are implicitly affecting the cognitive abilities of their students related to the mental process of knowing, learning, and understanding with respect to the blended learning method used.

Background of the study

Today, almost any definition of the term “blended learning” involves online methods mixed with face-to-face instructional techniques, as Williams and Kultur (2008) pointed out "there are many definitions of blended learning, but essentially it means using a blend of the best features of face-to-face classroom teaching with online learning through the Internet" (p. 5). However, although there is abundant literature that emphasizes the benefits of blended learning to increase student satisfaction (Lai, Yeh, & Ho, 2005), many teachers are still hesitant to use computer-based methods because of their lack of expertise in proper usages of computers in an educational context.

Graham (2006) also added the fact that “one of the most commonly cited reasons for blending is more effective pedagogical practice. It is no secret that most current teaching and learning practice in both higher education and corporate training settings is still focused on transmissive rather than interactive strategies” (p. 7). Therefore, the term “blended learning” ought to contain both interactive and face-to-face teaching and learning practices together. Which is inline with most leading theories of learning (e.g. constructivism, behaviorism) that favor pedagogically interactive teaching and learning processes.

Bilkent University, with its commitment to better quality education, is currently supporting the use of new instructional technologies and blended learning methods in education. Inline with this encouragement, one would presume that instructors of the Department of Computer and Instructional Technology Teacher Education would be competent and open to the use of computers and software tools related to instructional technology, because of their computer science background. This study explores the blended learning applications of the instructors and analyzes the intentions of the instructors and the perceptions of their student-teachers about the blended learning methods used.

Being a new department and some of its instructors' lack of pedagogical background but stronger ICT knowledge made this researcher curious about whether instructor or students are skilled about the blended methods and, whether enthusiasms of instructors who use blended learning methods are sufficient to satisfy their students who study pedagogy as well.

Problem

This research is focused on investigating some of the factors about blended learning methods within a Turkish tertiary education context. An important issue that needs investigating is how students' judgments about blended learning is influenced by the different ways instructors implement it. That is, blended learning is not a simple, one-dimensional concept, which is easily integrated into a curriculum that results in a uniform outcome for all students.

Teacher educators not only have the role of supporting student teachers' learning about teaching, but in so doing, through their own teaching, model the role of the

teacher (Lunenberg, Korthagen & Swennen, 2007). In this respect, teaching education, as a profession is unique differing from, say, doctors who teach medicine. During their teaching, doctors do not serve as role models for the actual practice of the profession i.e., they do not treat their students. Teacher educators, on the other hand, whether intentionally or not, teach their students and also teach about teaching. As being future teachers, how students of the Department of Computer and Instructional Technology Teacher Education perceive blended learning methods that are practiced by their instructors is in the focus of the present study. These students learn computers, pedagogy and instruction during their higher education.

It is the observation of this researcher that there is often a mismatch between the instructor's expectations, stated learning outcomes of blended learning and those of the students. How this arises and what the implications are for teaching and learning need further investigation particularly within the Turkish education context.

A major 'gap' in the research literature exists about how blended learning affects social relationships among students, and between students and teachers. How such changes in social relationships may influence teaching and learning within blended learning is not clear. A key consideration is whether such changes result in better student learning outcomes or not. Therefore, in order to provide some empirical data for future researchers a question about the possible effects of blended learning methods to teacher-student and student-to-student relations were asked to the instructors and students of the CTE Department.

Another important variable that likely has an effect on the success and achievement of the expected outcomes of blended learning is the students' prior experience with IT, their level of IT knowledge, skills and general competence with related hardware

and software. Not enough is known about how these factors influence students' opinion of blended learning.

Finally, it is desired to know more about the impact of the students' opinions of blended learning on their motivation, attitudes and learning outcomes. This research addresses above-mentioned questions within Turkish education context.

Purpose

For any blended learning program to be successful, it has to emulate a teacher's guidance and interaction (Desai, Jeff & Thomas, 2008). Failures in the program can be contributed to the lack of a supportive learning environment provided to the learner. Successful blended learning programs provide structure in the form of timelines and goals for potential learners by the instructor. Therefore, instructor plays an important role.

More committed teachers do use blended learning for a variety of important teaching/learning purposes. Some of them use it as an aid for better teaching, others as a sole teaching tool, or as an extension of their classroom teaching to develop students' different educational needs. Hence, it is difficult to generalize about the use and effects of blended learning given the variability of teacher practices and presumably student perceptions towards this technology.

Different teachers use blended learning for different purposes. The fact of the matter is that most of the CTE instructors do not receive formal pedagogical training and yet they try to practice different blended learning methods with student teachers who do study pedagogical courses, unlike their computer science instructors.

Students, who encountered blended learning during their teacher education training with different teaching/learning strategies, may have different perceptions of this approach than instructors who practice it. Therefore, students' view of different blended learning strategies and their early perspectives of different teaching/learning approaches may affect their teaching career in the future. Additionally, as being change agents, opinions and experiences of today's students who are taught to be teachers of tomorrow will certainly contribute to shape the future of blended learning. Hence, assessment of today's teacher education students about their instructors' approaches to blended learning techniques is important and should be studied to see the attitudes of future teachers towards this teaching/learning concept during their pre-service education.

What this research is expected to reveal:

1. *Practices and perceptions*.

    a. What type of blended learning methods is being practiced in the CTE Department?

    b. Are teacher education students aware of the blended learning methods that are being practiced by their instructors?

2. *Social relations*. Do students and instructors of the CTE Department think that blended learning increases social relations among the students and between students and instructors of the CTE Department?

3. *Computer literacy.* Do students and instructors of the CTE Department think that previous experience with computers and Internet is related with the success of the use of blended learning in higher education?

Research questions

As being future users of blended learning methods, students in the Department of Computer and Instructional Technology Teacher Education are the main participants of this study. And in order to see and compare the differences between the students' perceptions and the instructor's intention of specific application strategy, instructors who use different blended learning methods were questioned and interviewed.

This study will address the following questions:

1. What are the CTE students' perceptions of the blended learning methods used by their instructors'? How do their perceptions compare with the intentions and practices of their instructors?
    a) What blended learning strategies are practiced by the CTE instructors?
    b) What are the CTE instructor intentions of using blended learning methods?
    c) How do CTE students experience blended learning in their courses at Bilkent University?
    d) How do students respond to various blended learning strategies they experience in their courses?
2. Do CTE instructors and students think that blended learning affects social relations between students, and between instructors and students?
3. Do CTE instructors and students think that computer literacy affect the students' participation towards blended learning applications?

Significance

"Teaching has been described as a set of techniques or behavior, as a form of clinical decision-making, as a cognitive apprenticeship based in disciplinary understanding…" (Darling-Hammond & Bransford, 2005, p.407). So, students of teacher education are not only gaining information about their future profession in formal courses but they also acquire manner and style from their teachers, which usually comes in the form of different teaching strategies in blended learning courses. Whether students grasp this knowledge of an aspect of hidden curriculum is of importance for their professional development as a teacher. Therefore, present study looks into those issues that will have important implications for practice.

The purpose of this research is more practical than theoretical. The present researcher tries to examine the modeling behaviors (through blended learning applications) of teacher educators as a means of changing the views and possibly future practices of student teachers.

Another reason why CTE Department was chosen for this study is that the number of courses with blended learning methods to the total number of courses offered is higher than any other department at Bilkent University. In total, there are 24 CTE courses listed in the curriculum. Some of these courses are not taken by the students yet, because of the recent curriculum changes by YÖK (Higher Education Council of Turkey). And, the University's Moodle website reported a two fold rate of increase in two years from 7 courses (2007/2008 Spring Semester) to 16 (2009-2010-Spring Semester) that contain blended learning applications. The increase may be due to the technical background and familiarity of CTE instructors to the computer-related technologies is more than any other department where student teachers are educated.

Therefore, the proportion of courses that contain blended learning techniques is 16/24 (67%) including the not-practiced-yet courses.

Furthermore, CTE students will be the change agents who will be influencing the future of blended teaching/learning methods, as well as practicing such methods in their professional life. Also, this department applies distinct course delivery practices aligned with different areas of education.

The research is also expected to reveal whether increasing number of blended learning applications in this department is achieving any side effects regarding the overall educational objectives of the department. For instance, how social relations among students and between students and teachers are being affected by the different applications of blended learning methods.

Definition of the key terms

Blended Learning (BL): is a teaching/learning strategy, which blends online learning methods with more traditional methods of learning and development for a certain instructional purpose. More detail will be given in Chapter 2.

e-learning: The use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration ("e-Learning," n.d.)

Instructor: Academic staff who teaches students, often a course of study, lesson plan, or a practical skill, including learning and thinking skills in blended style.

Face-to-face: A term used to describe the traditional classroom environment. Students and teachers are in the same location at the same time ("Manitoba Education," n.d.).

Moodle: is a free software e-learning platform (also known as a Course Management System (CMS), or Learning Management System (LMS) or a Virtual Learning Environment (VLE) ("Moodle," n.d.).

Online: Connected to a computer network or accessible by computer ("Webster's Online Dictionary," n.d.).

Conclusion

In this chapter, the purpose of the study, research questions, and the significance of the study were discussed. Some background information about use of blended learning in the CTE Department of Bilkent University was also presented. Several technical terms that will be used throughout the study, which may need to be clarified, were also listed and defined at the end of this chapter. The Second chapter of the thesis document will discuss some current issues and related literature review about the blended learning in curriculum. The third chapter will describe the methodology, research design, data sources, data collection instruments, data collection and analysis procedures together with the limitations that should be taken into consideration about this study. The fourth chapter will present the analysis of the data and the results. The final chapter will outline the conclusions of the research and the implications for further study.

CHAPTER 2: REVIEW OF RELATED LITERATURE

Introduction

Almost every aspect of modern life is affected in some way by information and communication technology. Many people utilize technology to make decisions, communicate, reflect, synthesize, evaluate, gain or distribute information, among many other purposes. One would be difficult to find a single professional, regardless of career field, going through an entire workday without touching a computer or any other electronic communications device. However, the same level of technology use cannot be found in all schools that are meant to prepare students to future lives and careers in the "professional" world.

As a matter of fact, technology is not an alternative to teachers or educational institutions (Kerres & De Witt, 2003). They will coexist with traditional approaches of teaching and training for the benefits of learners. But, the injection of technology into education may also present a change in the general framework that describes the didactical design decisions, choice of delivery systems, and the definition of the term “education”.

The Princeton University defines “education” as “the gradual process of acquiring knowledge”, and “the activities of educating or instructing” (“Princeton University WordNet,” n.d.). This definition of education suits very well to the concepts of blended learning. The activities and the knowledge acquirement process can be defined in terms of different techniques and methods. Integration of various electronic means and software tools into instruction provides different teaching and learning systems, which in turn, results in better, efficient and effective “education”.

As ICT and other related technologies improve, teaching/learning systems become easier, quicker and more efficient. But, the term "blended learning" that defines such teaching/learning systems is still cloudy and does not provide a conceptual framework (Kerres & De Witt, 2003). It simply refers to the traditional education that is enriched with the use of computerized technology and learning with technology. The major challenge is to find the right mixture of blended learning arrangements, its components and projections on the instruction to form a concise and up-to-date definition. For the time being, it is an intuitive endeavor that has to accommodate to changing situational demands of the instructors and learners.

Today, many teachers use LMS/CMS type of software tools as improved instructional delivery methods. There are a lot of such tools available on the market; several of them are open-source and free of charge. Moodle is one of them and it is gaining wide acceptance among the departments of Bilkent University. Its usage has increased approximately 217% during the last four academic semesters, from 252 courses to 548 courses (Can Kültür, personal communication, February 23, 2009). Whether this rapid increase is reflected on the quality of education and effective teaching/learning environment is worth to study but it is not within the scope of this research.

There may be different aspects of any possible effects from the curriculum point of view. Almost all stakeholders are affected by different applications of this innovative teaching/learning tool. Not only at Bilkent University but overall very little research has been done on the effectiveness of instructional technology on student achievement (Pinder, 2008). The first one is the effect of the software tool on individual teachers and their strategy of delivering the course content to the students

throughout the semester. The other possible effect might be on the administrative side of the curriculum. What administrators think about its effects on the legislative, financial and social issues of the curriculum? Because of its online nature, course related information could be closed to the public; hence copyright infringements can be questioned. Also possibility of huge classes may bring financial debates both in terms of implementation and maintenance of the system and management of social relations. Yet another effect, which should be the main center of concern, is about the students. How students, socially and educationally, are affected by different applications of this educational tool?

Kerres and De Witt (2003) claim that even though blended learning arrangements combine technology based learning with face-to-face learning and have become quite popular in different contexts, but models for their didactical design that are based on theoretical concepts are still missing. Therefore, academically speaking, designing a new course and delivering it via blended learning methodologies still needs a theoretical and practical background. As it is said earlier, blended learning methods still depend on the intuitive endeavor of the instructors and the learners.

When teachers design a new course they consider several different approaches (Miner & Hofmann, 2009). The content can be delivered as a role-play session supported by lecture in a traditional classroom, a narrated slide presentation, an e-learning module, a computer simulation, a video, or a job shadowing experience, etc. Passively watching a video or an e-learning module is a less effective means of skills transfer than a course attended by other participants with whom the teacher meets face-to-face regularly. Hence, one can easily claim that blended learning that covers all above mentioned delivery methods becomes the best instructional strategy.

Because of the fact that it satisfies all main concerns of course content delivery in order to accomplish the preset learning objectives.

On the other hand, when students use technology to identify and collect information, they no longer depend on teacher and books as sole sources of information. In late 1990's, different universities introduced a new practice of distance education that can benefit from the use of technology in a way that promotes and encourages educators to shift, in teaching, from a teacher-centric model to a learner-centric model (Shehab, 2007). Colis and Moonen argue that this is a hybrid of traditional face-to-face and online learning so that instruction occurs both in the classroom and online. This model offers some of the conveniences of fully online courses without the complete loss of face-to-face contact (as cited in Shehab, 2007). Typical instructor's activity in a F2F and online courses are given Table 1. Obviously a blended course represents a workload that occurs in between the two (i.e. F2F & online).

Table 1

Typical Instructor Workloads (as Cited in Puzziferro, 2007)

Instructor Activity	F2F	Online
Preparation	2 hrs/week to review assigned readings, prepare lectures & class activities.	2 hrs/week to review assigned readings, prepare discussion questions, and review content.
Class time	2.5 hrs/week	2 hrs daily to read student posts, respond to student emails, questions & moderate discussions.
Online	2-3 hrs/week for individual contact, reading and grading assignments	2-3 hrs/week for individual contact, reading and grading assignments
Total Time	6.5 – 7.5 hours per week	18-19 hours per week

Obviously, the emphasis should be placed on “transforming” rather than “automating” teaching and learning when using technology in education (Gribbins et al., 2007). Therefore, usage of technology is not something the instructors or students should take for granted. Perhaps, what is important is the content delivery and how it is delivered rather than the method of delivery itself. As being one of the oldest professions in the history of human beings, and considering its dependence on individual psychological and social aspects, almost every teacher has got his or her way of delivering his/her course content. In this respect, some educators do not like the term “blended learning” at all and criticize its usage. Oliver and Trigwell (2005) argue that the term ‘blended learning’ is “ill-defined and inconsistently used. Whilst its popularity is increasing, its clarity is not.” Oliver and Trigwell (2005) state that definitions of blended learning lack “an analysis from the perspective of the learner". So, they suggest the need for a "shift away from manipulating the blend as seen by the teacher, to an in-depth analysis of the variation in the experience of the learning of the student in the blended learning context”. Along the same line as Oliver and Trigwell's (2005) criticism of the use of the term "blended learning", Don Morrison (2003) writes, "Personally, I’m much more comfortable talking about the strategic use of learning delivery channels than ‘blended learning’. Every enterprise has learning delivery channels—it's a question of identifying them and deciding which to use when". He continues by saying, "I have heard blended learning dismissed as the Emperor's New Clothes on the basis that all learning—from infancy, through the classroom, and into the enterprise—is blended learning."

Mainly, there are two characteristics that are ascribed to blended learning methods for practical purposes:

- Blended learning allows organizations to gradually move learners from traditional classrooms to e-learning in small steps making change easier to accept (Driscoll, 2002).

- Blended learning mixes various event-based activities, including face-to-face classrooms, live e-learning, and self-paced learning and it is used to describe a solution that combines several different delivery methods, such as collaboration software, Web-based courses, EPSS (Electronic Performance Support System), and knowledge management practices (Valiathan, 2002).

Only time will show whether Driscoll's (2002) claims of blended learning that can be seen as a strategy to help starting e-learning in organizations or Valiathan's (2002) opinion of blended learning as a mix of various event-based activities, including e-learning and self-paced learning will be part of the future definition of education. Therefore, whether the application itself will stay or it defines a transitionary phase to the future education will be answered in the future.

What is meant by blended learning?

Blended learning means different things to different people (Driscoll, 2002). Some people even confuse the term e-learning with blended learning. In reality, as it is indicated by Lee and Narracott ("Blended Learning and Training," n.d.), e-learning is a form of online learning, typically delivered via a CD/DVD or an intranet/internet web site. Blended learning can embrace e-learning (i.e. e-learning can be a component of blended learning), but e-learning is not blended learning by itself. So, e-learning with its enormous potential revolutionized teaching/learning process and rapidly evolved into a concept called "Blended Learning" (Thorne, 2003, p.2).

Some of the popular definitions of blended learning include:

- **Blended learning** is the thoughtful integration of classroom face-to-face learning experiences with online learning experiences (Garrison & Kanuka, 2004). Or, as it is described by The Pennsylvania State University (Penn State) "A blended learning approach combines face to face classroom methods with computer-mediated activities to form an integrated instructional approach" ("Web Learning @ Penn State," n.d.).

- **Blended learning** is learning that is facilitated by the effective combination of different modes of delivery, models of teaching and styles of learning, and is based on transparent communication amongst all parties involved with a course (Heinze & Procter, 2004).

- **Blended Learning** incorporates a mix of online and face-to-face elements, containing a mix of formats, media and experiences. Blended learning is the combination of multiple approaches to teaching or to educational processes, which involve the deployment of diversity of methods and resources or to learning experiences that are derived from more than one kind of information source. Examples include combining technology-based materials and traditional print materials, group and individual study, structured pace study and self-paced study, tutorial and coaching. ("Wikipedia," n.d.).

- **Blended learning** is used to describe a solution that combines several different delivery methods, such as collaboration software, Web-based courses, EPSS, and knowledge management practices. Blended learning also is used to describe learning that mixes various event-based activities,

including face-to-face classrooms, live e-learning, and self-paced learning (Valiathan, 2002).

- **Blended learning** is an educational formation that integrates e-learning techniques including online delivery of materials through web pages, discussion boards and/or email with traditional teaching methods including lectures, in-person discussions, seminars, or tutorials ("TeAchnology; The Online Teacher Resource," n.d).

There is no consensus on a single agreed-upon definition for blended learning ("Web Learning @ Penn State," n.d.). That's why, Penn State prefers to use the term "blended courses" instead of "blended learning" (**Blended Course**: Courses that combine Web and traditional classroom instruction. The percentage of online material vs. classroom sessions can vary depending on the individual course ("Web Learning @ Penn State," n.d.). This confusion on the universally accepted definition of the term "blended learning" is also reflected by Osguthorpe and Graham (2003) "... there is considerable disagreement regarding the meaning of the term" (p. 227). In their own words, they conceptualize the term as follows; "Blended learning combines face-to-face with distance delivery systems. ... Those who use blended learning environments are trying to maximize the benefits of both face-to-face and online methods" (p. 227). It would be very difficult to find any teaching/learning system that did not involve multiple instructional methods and multiple delivery media. Among all those diverse definitions of the term this researcher finds Graham's definition as the most comprehensive and best approach. "Blended learning is the combination of instruction from two historically separate models of teaching and learning: traditional F2F learning systems and distributed learning

systems" (Graham, 2006). His definition also emphasizes the central role of computer-based technologies in blended learning (p. 3). Of course, among other definitions, these have only practical implications and lacking classification and theoretical background.

But, when do we call a course is BL and when its online? Another words, what is the proportion of online methods to the traditional methods in order to present a course as "blended"? According to a survey that was conducted by the Sloan Consortium in the USA (2010), a course is considered as blended or hybrid type when proportion of online delivered content is between 30 to 79% (see Table 2).

Table 2

Content in the Blended vs. Online Instructions (Allen & Seaman, 2010)

Proportion of content delivered online	Type of course	Typical description
0%	Traditional	Course with no online technology used – content is delivered in writing or orally.
1 to 29%	Web Facilitated	Course that uses web-based technology to facilitate what is essentially a F2F course. Uses a CMS/LMS or web pages to post the syllabus and assignments, for example.
30 – 79%	Blended/Hybrid	Course that blends online and F2F delivery. Substantial proportion of the content is delivered online, typically uses online discussions, and has F2F meetings.
80+%	Online	A course where most or all of the content is delivered online. Typically no F2F meetings.

On the other hand, some researchers approached the term to back it up with a didactical framework. Like Kerres and De Witt (2003) there are three different main

components of any blended-learning course and the individual instructor combines elements from those components in order to support learners to reach their learning objectives. Figure 1 shows (Kerres & De Witt, 2003) the three main components of a blended learning course. Kerres and De Witt (2003) also admit that the preference for a certain pedagogical philosophy (constructivist, behaviorist, etc.) does not automatically answer the question of what component to include in what quantity. The stated specifications of learning objectives define the relative weight of the three components. Admittedly, Kerres and De Witt also points out that neither 'content' nor 'communication' or 'construction' is always necessary in all blended learning arrangements, which does not help the idea of offering it a framework that will help researchers to formalize and conceptualize the term.

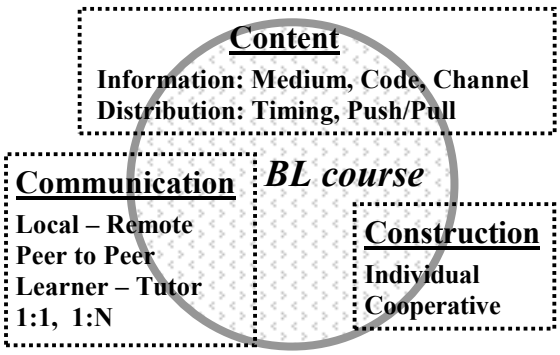

Figure1. Components of a blended learning course.

Meanwhile, supporting Kerres and De Witt, it is suggested by several authors like Driscoll (2002), Bersin & Associates (2003), Garrison & Kanuka (2004), Orey (2002), Singh & Reed (2001), Blended Learning (2010), Blended Learning in Practice (2010), Thomson (2002) and Sands (2002), blended learning refers to the following common characteristics:

- It combines or mixes modes of web-based technology (e.g., live virtual classroom, self-paced instruction, collaborative learning, streaming video, audio, text, etc.).
- It combines various pedagogical approaches (e.g., constructivism, behaviorism, cognitivism, etc.) to produce an optimal learning outcome with or without instructional technology.
- It combines any form of instructional technology (e.g., multimedia, videotape, CD-ROM, web-based training, film, etc.) with face-to-face instructor-led training.

Therefore, even though blended learning applications still need a theoretical framework that indicates the right mix, they are expected to, at least, encompass the concepts mentioned above.

What is the significance and future of blended learning?

One of the recognized benefits of a blended learning environment is that it allows educators to provide in-class pedagogical richness of F2F class sessions (Osguthorpe & Graham, 2003). It also gives another venue for students to access information and knowledge. Of course social interactions, cost effectiveness (blended learning systems can reach a larger, globally dispersed audience in a short period of time) and ease of revisions (easier to update the information that is being distributed thru interactive electronic media) are among reasons why one might choose to design or use a blended learning system. As a summary, Bonk and Graham (2006) claim in their book "The Handbook of Blended Learning: Global Perspectives, Local Designs" that people choose BL for three reasons:

- Improved pedagogy,
- Increased access and flexibility,
- Increased cost effectiveness. (Ateş, 2009)

In a survey by Marquis (2004) it was found that 94 percent of lecturers believed blended learning is more effective than face-to-face based teaching only (as cited in Puzziferro, 2007). Of course, the ultimate objective of a blended learning course is to combine the best aspects of face-to-face and online instruction, therefore, BL can be enhanced to design to manage the F2F portion more efficiently and classroom time can be better used to engage students in mind-stimulating experiences. Meanwhile, the online portion of the course can provide students with multimedia-rich content at any time of day, anywhere the student has internet access, computer labs, coffee shops, or the students' homes and dormitories. This also brings an increase in scheduling flexibility and convenience for students. Additionally, courses that use blended learning methods can result in increased course-completion rates, better students attitudes towards the subject, learning outcome gains, increased enrollment retentions and increased student satisfaction with the mode of instruction (Twigg, 2003).

These benefits are realized as educators incorporate technologies into the blended learning environments. Which in turn, allows them to migrate face-to-face class time from a model where information is dispensed to a model that focuses on higher order thinking and skill development (which is also in accordance with the Bloom's Taxonomy of educational objectives). This can be accomplished by posting discussion questions, chat sessions and providing hands-on training or experiments,

or by dispensing and assessing information in advance with the help of online/interactive media.

The recognized potential of blended learning, to bring learning closer to learners, increases its significance when employees and distance-learners are considered. E-learning is becoming a dominant delivery method in workplace learning across organizations of various sectors and of varying sizes (Kim, Bonk & Zeng, 2005). This could be seen when commitment to the method is surveyed in different sectors. The most committed to e-learning are financial services/insurance industries and the education sector, each with 64 percent either agreeing with the statement that their organization was strongly committed to Web-based learning (Fig.2).

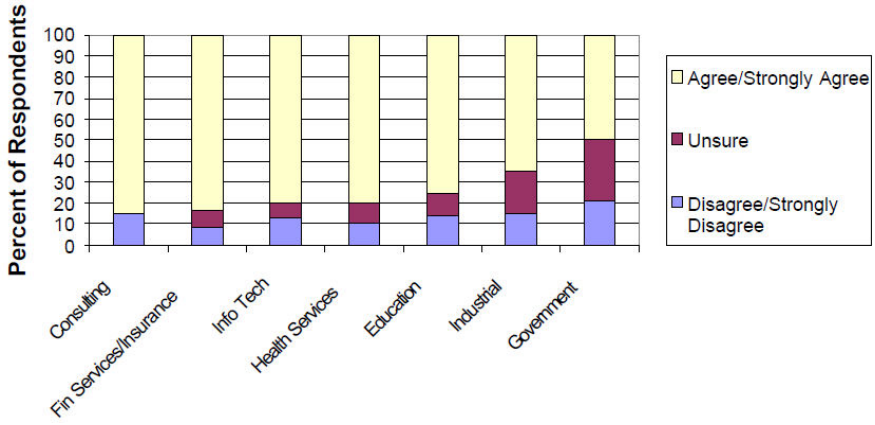

Figure 2. Interest in web-based learning by industry type (Bonk, 2002).

Collaborative and authentic learning approaches will be more widely used as part of blended learning in the coming years (Kim et al., 2008). While a certain educational model is used to develop a certain skill, behavior or competency, instructors can use several different delivery methods to achieve the desired outcome. Some of the delivery formats can be learning management systems, e-mails, webinars (online web-based seminars, like Microsoft's Live Meeting), e-books, simulations,

frequently-asked-question (FAQ) lists, instant messengers, online tests, web discussion forums and news groups, etc..

When cost and technology requirements of implementing blended-learning environments are considered the future presents both potentials and challenges. Kim et al. (2008) conducted a survey about training professionals (chief learning officers, training managers, trainers/instructors, and e-learning developers) on the current status and future trends of e-learning in workplace settings. Even though an earlier survey on workplace learning by the same author found that most respondents' organizations still relied on conventional, instructor-led training, as Figure 3 shows (Kim et al., 2005), the new survey indicated that e-learning has become an increasingly important delivery format and may even dominate training in the near future. In fact, 50 % of the respondents predicted that e-learning would become the dominant form of training within their organization by 2014 (Kim et al., 2008).

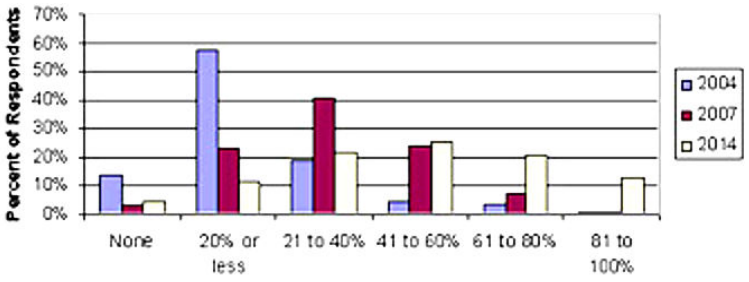

Figure 3. Estimated percentages of employee training (using blended learning methods)

In Kim, et al.'s (2008) latest survey, they have found that blended-learning has become a popular delivery mode in work place and they claimed that over two-thirds of those surveyed responded that their organizations were already using blended learning approaches. By the same token, 68% of those surveyed predicted that their organizations' spending in blended learning would increase. (Kim, et al., 2008).

Another survey that was conducted by the Sloan Consortium indicated that for sixty-three percent of all reporting institutions, online learning is a critical part of the institution's long-term strategy. (Allen & Seaman, 2010)

On the other hand, in a relevant survey (see Figure 4), Bonk and Graham (2006, Chapter 8.3) found that more than 7 in 10 respondents, who work in institutions of higher education, anticipated that they would offer more than 40 percent of their courses in blended form by the year 2013. This is also a clear indication of blended learning is proliferating across college and university campuses.

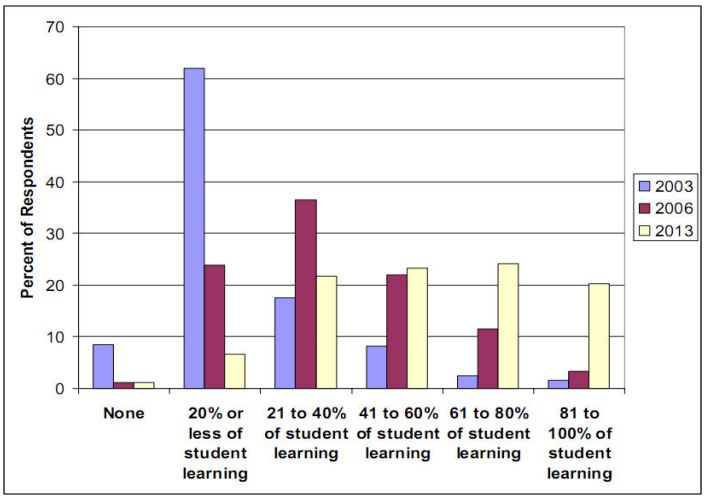

Figure 4. Expected future growth of blended learning in higher education settings.

It is estimated that the role of instructors and/or trainers will also change in the future because of online methods and growing e-learning inclusion into blended learning applications (Kim et al. 2005). A new line of professional people, so called, "online instructors" will start playing roles that are substantially different from today's traditional classroom instructors. The course designer or developer's role will grow the most during coming decades, followed by online mentor/coach and e-learning trainer/instructor (Kim et al. 2005). By the same token, knowledge management

tools, online simulations, wireless technologies, and reusable content objects will be the ones that would impact the delivery of blended learning courses in the near future (Kim et al., 2005). Whether educational institutions are ready for this challenge, and a crop of afore-mentioned professionals will be there when the need arrives is another question to be answered.

It seems to be the case that, proportion of e-learning within blended learning increases as blended learning applications expand simultaneously. But, is there a chance for e-learning to turn into some other forms of learning? What are the challenges? Georgiev, Georgieva and Trajkovski (2006) talk about transitioning from e-learning to m-learning. M-learning is a term coined to mean the acquisition of any knowledge and skill through using mobile technology, anywhere, anytime, that results in an alteration in behavior (Geddes, 2004). Mutual complementation of traditional learning, e-learning and m-learning will constitute the mobile learning of the future. Mobile communication devices will ensure the optimal access of the students to educational content. Thus, from preparation of the courses to their delivery and assessment methods will be challenged by the m-learning methods and procedures.

As education becomes more impersonal with e-learning and m-learning facilities, privacy becomes an important question. Can authentication of a learner who joins the network from far away be done with 100% accuracy? How much the technology can help to differentiate a real user from a fake one? Or, how can an instructor be 100% sure about the genuinity of a prospective learner?

Yet another challenge is getting developers interested in creating educational applications that concerns e-learning and/or m-learning media. Currently developers

tend to ignore markets with a few million customers (Ong, 2010). When market becomes large enough for bigger revenues then one can expect bigger competition hence, better products in terms of blended learning components.

Lastly, management of information overload is becoming another area of concern. There is affluent of Internet references even for ordinary blended learning applications. "Which information source?" is a challenge for instructors as well as students. As sourced from the University of California's Berkeley School of Information Management and System (SIMS) Report called 'How Much Information?', Lyman and Varian (2003) predicted the size of the Internet as far as volume of information is concerned:

- The direct accessible Internet consists of about 2.5 billion documents and is growing at a rate of 7.3 million pages per day.
- When other connected databases, intranet sites and dynamic pages are included, there are about 550 billion documents (95% is publicly accessible).

These findings show that we are already taking in a lot of information. If it takes 10 seconds to read a page, 2.5 billion pages (given that each document is a page long) will take approximately 800 non-stop years, as of 2003. Finding of useful information as resource for students and verification and validation of the genuinity of such information in a web page is also a big concern for instructors. So, further information overload is already a big challenge for the ones who want to integrate e-learning into their blended learning applications and desire to manage their instructional affairs better.

While it is impossible to see entirely what the future holds, we can be quite sure that the trend towards blended learning systems will increase. It may even become so widespread and common that we may eventually do not concern anymore about the terms like e-learning or m-learning and drop the word "blended" and just call it learning.

Models and different approaches to blended learning

Obviously, one needs to formally categorize and conceptualize the researched items with a well-formed theoretical framework when studying in academic environment. Being a relatively new concept, this researcher was not able to find out a good, solid theoretical background about blended learning. Literature exists about the applications and practical implications of this educational method. But, as far as instructional engineering is concerned, articles about theoretical approaches to the method are not as affluent as the papers that were written to study its practical applications and implications.

The reason why we are interested in the theoretical side and models of blended learning is that we are interested in the question of "how to blend?". As there are teachers who practice blended learning methods, there seems to exist different "blends". Because of the fact that each teacher has specific preferences and strengths in the way they approach learning, there exists different applications of blended learning. Nonetheless, there are some attempts to classify the practical applications as mentioned in the following paragraphs.

Bonk and Graham (2006) draw the perspective that "blending can occur at several different levels: institutional level, program level, course level and the activity level. The learner or the designer/instructor determines the nature of the blend:

- *Activity level*. Blending at the activity level occurs when a learning activity contains both F2F and computer-based media elements. Military training can be a good example for this type.

- *Course level*. A course level blend involves combination of distinct F2F and computer-based online activities that are used as part of a course. Most of the university courses are good examples.

- *Program level*. It is observed and declared by Ross and Gage (as cited in Bonk & Graham, 2006) blends in higher education are often occurring at the degree program level. For example, Salmon & Lawless (as cited in Bonk & Graham, 2006) mentions a program, which allows students the choice of completing the program completely online or online with F2F sessions.

- *Institutional level*. There are institutions of higher education that create models for blending at an institutional level like University of Phoenix (as cited in Bonk & Graham, 2006) where students have F2F classes at the beginning and end of the course with online activities in between.

In another article Picciano and Dziuban (2006) make the following approach to blended learning methodologies (p. 85). The possibilities of blended learning have the potential to help instructors re-conceptualize the teaching and learning relationship and move teaching to a "more active learning centered model". Or, blended learning may just be used to "perpetuate current practices by increasing the

productivity or convenience of instructors and students" – e.g., online "course-casting" that enables students to skip F2F lectures. In fact what they point out is that "some blends seem to transform the instruction while other blends just seemed to enhance existing instructional practices". This researcher believes that, at least as far as his experience and observations in the Bilkent University concerned, the "transmission" model still dominates over "interactive" strategies even in today's higher education.

Clark (2003) mentions about the 'Velcro' approach to blended learning, as being a tendency to go with intuitive feelings and put some classroom training and e-learning together in a primitive manner, instead of combining things together rather seriously and blend and/or integrate them into a single learning experience (or environment). As previous concerns stated, in the realm of indefinite, imprecise theoretical background of the term "blended learning", like the Turkish proverb describes "Her yiğidin bir yoğurt yeyişi vardır" (=everyone has their own peculiar style), every teacher has got his/her own peculiar style of implementing BL techniques.

This lack of theoretical framework however, complicates the categorization of different forms and formats of blended learning. In order to help categorization efforts, a literature search reveals some surveys that were administered to find out the application strategies or methods of blended learning applications.

Kim and his colleagues compiled instructional approaches or methods of blended learning applications in educational settings using the results of a survey (Kim et. al., 2005). Categorization of answers of the participants in Kim et. al.'s survey is depicted in Table 3.

Table 3

Instructional Strategies for BL Methods (Kim et al., 2005)

	Response Options	Response Rate %
1	Authentic cases and scenario learning	63.04
2	Simulations or gaming	50.00
3	Virtual team collaboration and problem solving	46.52
4	Problem-based learning	42.17
5	Coaching or mentoring	39.13
6	Guided learning	37.39
7	Self-paced learning	34.35

This table reflects the applications of different BL methods that take place in practice. Which, in turn, can lead to formal categorization efforts. But, Kim et. al. hesitates to make any conclusions in that respect (i.e. drawing a theoretical framework for BL methods). Additionally, in order to find out what participants of the survey think about the future of blended learning applications, they were also asked how future advances in Internet technologies (e.g., extended bandwidth, wireless Internet, etc.) could affect the instructional strategies for e-learning. They predicted that use of interactive simulations would increase the most during the coming decade due to advances in Internet technologies, followed by multimedia presentations, authentic learning experiences, and global collaboration and perspective-sharing. This compilation of different applications and future forecasts identify different types of BL, and can be appreciated as efforts towards theoretical construction of BL methods.

Unfortunately, such surveys do not try to categorize the blended learning applications in a certain framework, but statistically collect the opinions of participants and they lack of comparison against certain theoretical backgrounds.

All efforts of this researcher to find relevant articles in the literature that proposes a theoretical background led to Valiathan (2002). In an effort to classify blended learning applications, Valiathan (2002) provided a rather solid perspective for instructors. Valiathan (2002) used combinations of delivery methods, such as collaborative software, web-based courses, electronic performance systems and knowledge management practices, as well as event-based activities like face-to-face classrooms, live e-learning, and self-paced learning, etc., to describe blended learning applications. Hence, a relatively simple and practical classification of blended learning activities can be done as follows:

- Skill-driven model combines self-paced learning with instructor support to develop specific knowledge and/or skills. Lab-oriented courses where specific professional knowledge is taught and practiced or an art-oriented course where specific painting skills are taught can be considered as examples of this approach. The instructor monitors the progress of the learner, evaluates online work, builds and facilitates online community of course participants via e-mail or forum discussions and/or F2F meetings to respond to the content questions.

- Attitude and behavior-driven model combines various events and delivery media to develop specific behaviors or attitudes. This model blends traditional F2F learning with online collaborative learning events. Collaborative learning, which is implemented using F2F sessions and/or computer-based events are combined to achieve the desired outcome (in the form of developing attitudes and behaviors). Instructors use this model to teach content that requires learners to try out new behaviors. For example, a

course where negotiation skills with a customer or self-regulated learning skills are taught falls under this category.

- Competency-driven model combines performance support tools with knowledge management resources and mentoring to develop workspace competencies. Learning that facilitates the transfer of tacit knowledge, which is retained by experts. The idea of competences is that they are based on identifiable skills or capacities, and hence are not rooted in a body of content but rather in an implementation of a behavioral pattern and/or of thinking pattern that results in a certain level of performance. (CEN/ISSS, 2005). With this model, learners absorb tacit knowledge by observing and/or interacting with experts on the job; activities may include a blend of online performance support tools with live mentoring. F2F or online synchronous meetings with professional experts or life-long education are good examples of this model.

The importance of computer literacy skills

Do all students have the requisite computer skills to benefit from blended learning is a key question. Is there any positive effect of earlier exposure to computers on the success of blended learning applications in the higher education? Obviously, a follow-up questions like is there a proven positive effect of computer literacy on the success of blended learning applications, does computer literacy motivate students to become better participants of blended learning processes, and increase the feeling of liability to enhance their learning skills, do not degrade value of the first question.

The survey results indicated that students do not enter the teacher education programs with adequate computer literacy skills (Wang, 2006). The results of Wang's (2006) studies also implied that student learning was negatively affected when trying to learn teaching methods and technology skills simultaneously. Students who are unfamiliar with computers, even the simple operations related to text-based communication, as well as issues associated with interface interactions, such as learning to navigate a website, posting and reading messages and uploading assignments can be challenging (Arbaugh, 2004). Similarly, in a study by Anderson and Borthwick (2002), one group of students received computer training integrated into a special-education methods course. The other group completed a computer-training course and the methods course separately. The results showed that the students who received stand-alone computer training achieved greater improvements not only in their technology capabilities but also in their abilities to teach with computers (as cited in Wang, 2006). Therefore, earlier exposure to computer-integrated materials certainly affects the students' comprehension of blended learning applications. So, this researcher thinks that the issue of varying levels of computer literacy skills among students can have a marked effect on the outcomes of any instruction using blended learning methods– irrespective of the quality of the software used or even the quality of the teacher.

Blended learning and social relationships

Blended learning methods particularly the ones that involve collaborative components may have many advantages but their use also raises questions about possible social effects on the individuals who use the method. And indeed, various forms of Internet-based learning do offer the "affordance" of online socialization and

networking (Hamburg & Lindecke, 2003). Which means in a sense that this instructional technology (i.e. blended learning) enables or creates another social component of educational life. Are those components of traditional training like cooperation and personal contact tend to "get lost" in blended learning concepts or do they mutate & exist in different shapes? Like Meyer claims in a face-to-face setting, students appear to have a higher concern for hurting others' feelings, but they are more willing to disagree with other students in an online environment (as cited in Garrison & Vaughan, 2000, p.93). And, does it lead to a social being where students want to be linked in the network, but they also want a lot of face-to-face time (Kvavik & Caruso, 2005)?

Interactions in a blended learning course are characterized as being eclectic within cooperative learning theories (El-Deghaidy & Nouby, 2008). As shown in Figure 5, there are three types of interaction: social, content and teacher that are integrated into any kind of blended learning strategy.

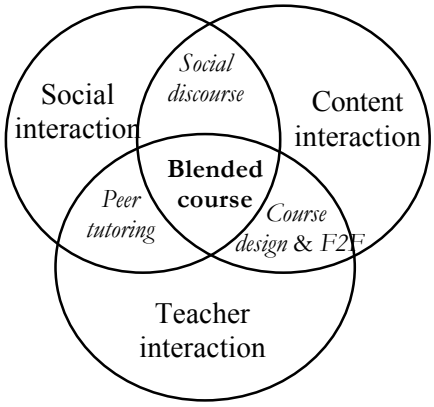

Figure 5. Students' interaction types in a blended learning course.

The first type of interaction is with the teacher who facilitates active learning and face-to-face interaction providing a social environment. Nevertheless, teachers design and manage learning sequences and select the appropriate media before

interacting with students. The second type of interaction is with 'content'. This relates to cognitive interaction of students with the concepts and skills presented in course modules. Social interaction, which represents the third type, is defined as the ability of learners to perceive themselves as a community that supports positive interdependence. Such interactions can happen throughout the learning process, as they share resources and work on cooperative assignments.

Another study about learning contexts uncovered three different conceptualizations of social presence (Caspi & Blau, 2008):

- as a characteristic of medium that enables (or disables) transmissions of social indicators that are essential to perceive another learner as "real",
- as the potential of a learner to project himself/herself socially and emotionally as a real person in an online community, and
- as a characteristic of a group, that reflects the level of social identification with, or sense of belongingness to an online learning group.

In essence, the constraints posed by the medium force users to adopt different communication strategies and social relations that help them build different images of the person and/or the community that they communicate with. (Caspi et al., 2008). These three theoretical alternatives, different levels of sensitivity to others that appeared as a function of social involvement and medium, certainly supports the present researcher about effects of blended learning in social relations.

The present researcher's aim is to bring in some additional information, which may help future researchers to study changing social relations because of blended learning applications. Therefore, this study is restricted to provide some information to the

second and third conceptualizations listed above because of the fact that social relations are a very broad research area, which involve social and psychological parameters, as well.

Conclusion

Depending on how people understand what it means and what they blend there are numerous definitions of the term “blended learning” (Kim et al., 2008), and that the topic is in need of a theoretical framework.

Bonk and Graham (2006) claim that blended learning will foster greater student responsibility for learning which is inline with the belief that blended learning environments increasingly become individualized; in particular, emphasizing visual and hands-on activities. This in turn brings the necessity to gain computer literacy skills in earlier phases of education!

In the future, courses with reduced classroom meetings or seat time will grow as universities find that blended learning increase learning outcomes (Bonk & Graham, 2006). Students instead of instructors will help instructional designers to make decisions about the type and format of blended learning. Hence, it will not be too bold to say that social relations between learners and instructors will take a different shape in the future.

CHAPTER 3: METHODOLOGY

Introduction

This chapter describes the methods, instruments, participants, data collection procedures, and data analysis methods related to the present study.

The study aimed to answer the following research questions:

1. What are the CTE students' perceptions of blended learning strategies compared to their instructors' intentions?
    - What blended learning strategies are practiced by the CTE instructors?
    - What are the CTE instructor intentions of using blended learning methods?
    - How do CTE students experience blended learning in their courses at Bilkent University?
    - How do students respond to the different approaches of blended learning strategies?
2. Do CTE students and instructors think that blended learning affects social relations between students, and between instructors and students?
3. Do CTE students and instructors think that computer literacy (=previous experience with computers and Internet) affect the students' participation towards blended learning applications?

With this study, the researcher aimed to investigate the blended learning methods that are used in the CTE department, instructor's main intentions when administering blended methods and how CTE students experience the blended learning methods. Also social aspects of blended learning and its relation to previously attained computer skills are analyzed.

Research design

This research uses both quantitative and qualitative approaches in research design. The researcher collected information to analyze the research questions. Instead of just statistically analyzing the data in the form of numbers, the researcher used a frame of reference to gain a better understanding of this study based on interpretations of participants' responses to the questionnaires and interviews. Therefore, although there are some sections where quantitative data is presented, a qualitative approach is the main approach used in this study. As far as quantitative data analysis is concerned, only the first research question was explored using a chi-square test. Although, statistical mean values (average value of the responses) were used in the analysis of the second and third research questions, main approach in the analyses of these questions are rather qualitative based on the information collected from questionnaires and interviews.

Interviews were held with instructors and students, including a pilot interview with an instructor. In an effect to reach the whole population who received blended learning treatments into the study, questionnaires were administered to the CTE instructors and 2nd, 3rd, 4th and 5th year students. Student questionnaire was piloted with three CTE students.

The main research model is presented in Table 4 below.

Table 4

Research Model

Main Questions	Sub-questions	Design	Instrumentation	Data Analysis
What are the Bilkent University's Computer and Instructional Technology Teacher Education Department students' perceptions of blended learning strategies compared to their instructors' intentions?	What blended learning methods are used by the CTE instructors?	Descriptive	Checklist & Questionnaire	Quantitative
	What are the CTE instructor intentions (academic, social, etc.) of using blended learning methods?	Descriptive	Questionnaire & Interview	Qualitative
	How are CTE instructor intentions of using blended learning strategies perceived by the CTE students?	Descriptive	Checklist & Questionnaire	Quantitative
	How do students respond to the different approaches of blended learning?	Descriptive	Questionnaire & Interview	Qualitative
Do CTE instructors and students think that blended learning affects social relations between students, & between instructors & students?		Descriptive	Questionnaire	Quantitative
Do CTE instructors and students think that computer literacy affect the students' participation towards blended learning applications?		Descriptive	Questionnaire	Quantitative

Context

This research was conducted in the Bilkent University, which is a private university and overseen by a not-for-profit foundation. The researcher himself has been working in the University as a part-time and full-time instructor since 1998.

The purpose of the study is to gain a better understanding of blended learning/teaching applications and perceptions of the teacher education students (pre-service teachers) towards blended learning applications in the Faculty of Education, namely the CTE Department. Moodle software tool is the main online medium for blended learning activities that are practiced in this department.

The research population is composed of students who may have taken computer related courses during their pre-university education. Therefore, keeping in mind that computer literacy in the high school or earlier, and previous experiences with computerized learning tools may affect the attitudes of students, one of the research questions was concerned about this variable. Hence, this research is valid within the context similar to the ones described above and, thus the results are not generalizable to the whole population of pre-service teachers.

Participants

Two different data sources were used in this study: instructors and students from the Department of Computer and Instructional Technology Teacher Education of Bilkent University's Faculty of Education. Student participants were second, third, fourth and fifth year students in this department.

There are not too many instructors who are using blended learning methods who are making effective and efficient use of Moodle in the CTE Department. Therefore,

two different instructors (one male, one female) who have used blended learning methods in their courses were interviewed. Purposeful selection of those instructors was done with the help of the primary supervisor of this researcher and one of the Moodle system administrators of Bilkent University. The selection was based upon the total number of hours spent connected to the Moodle as an instructor and total number of his/her students connected to the Moodle as well as the reputation for effective and efficient use of blended learning methods among colleagues. Another selection criterion was the number of Moodle features used during the course delivery process. The desired criteria were distinctive applications of the Moodle features, and the relatively higher number of features that were practiced. To ensure the reliability of the study, a pilot interview with another instructor from the CTE Department was conducted. So, three different instructors were interviewed altogether.

The total number of CTE instructors was 14 in total. All of them were handed over the questionnaire (excluding the researcher himself). Only 12 of them returned it. Therefore, data from 12 of the 13 were included in the study.

In spite of the fact that the research aimed to reach the maximum number of students who have already experienced a number of blended learning courses, only students who were in the 2^{nd}, 3^{rd}, 4^{th} and 5^{th} years participated in the study. First year students were excluded from the pool of research participants because, they were not yet exposed to sufficient number of blended learning courses. The number of CTE student participants was 44 to whom the questionnaires were given.

Instrumentation

Both interviews and questionnaires were used for data collection. Questionnaires were given to assess the instructors' type and level of blended learning strategies. They were also asked to specify their philosophy behind the blended learning methods. Students were given the questionnaire to assess their level of awareness and perception of the blended learning methods used by their CTE instructors.

The purpose of interviews is to evaluate or to assess people's opinions about a specific topic (Cohen, Manion & Morrison 2000). The interviews held by the researcher consisted of open-ended questions with some probing (used when the interviewee did not understand the question). The length of each interview was planned to be between 20 to 30 minutes. Although interview questions were prepared in English, for practical purposes and for the sake of clarity the actual interviews were held in Turkish. Interviews were transcribed for easier data analysis later on.

There were three types of questions comprising the questionnaires of instructors. The first one was a multiple-choice question about the personal opinions of and feedback from the instructors about blended learning methods that were practiced in the CTE Department. Second type of question was on a Likert scale where participants were asked to check their level of agreement with a number of statements. There were five options in the scale; 1 (disagree), 2 (somewhat disagree), 3 (neutral/undecided) to 4 (somewhat agree) and 5 (agree). Lastly, instructors were asked open-ended questions about how they see the perceptions of CTE students regarding blended learning methods, which were used by the instructors. All questionnaire items and answers were in English.

As for the items in the students' questionnaire, there were two types of questions: The first one was a multiple-choice question about the personal opinions of and feedback from students about blended learning methods that were practiced in the CTE Department. Second type of question was on a Likert scale where participants were asked to check their level of agreement with a number of statements. These questions were based on a five-point scale from 1 (disagree), 2 (somewhat disagree), 3 (neutral/undecided) to 4 (somewhat agree) and 5 (agree) for all items where participants were asked to check their level of agreement with each item. All questions were given in English while some of them included Turkish explanations to further clarify for students.

The researcher interviewed four students. The interviews consisted of open-ended questions with some probing, when the interviewee did not understand a question. The length of each interview was planned to be between 20 to 30 minutes. Although interview questions were prepared in English, for practical purposes and for the sake of clarity the actual interviews were held in Turkish. Interviews were transcribed for easier data analysis later on. All instruments were piloted to ensure validity.

Data collection procedures

This research falls in the descriptive category and developed to find the answers to the research questions given earlier, using interviews and questionnaires. Two types of data were collected, primary and secondary data. Primary data was gathered through interviews and questionnaires. Secondary data was obtained through pilot studies (interviews and questionnaires). The purpose of collecting secondary data was to ensure the internal validity of interview and questionnaire items.

There were two different and separate pilot studies. First pilot study was an interview, which was conducted with a CTE instructor at the beginning of the research. Another pilot study concerning the validity and comprehension level of the questionnaire items was conducted in the second phase of the research before the students were asked their opinions about the blended learning methods. The second pilot study comprised of a focus group study and a following pilot questionnaire with CTE students.

The next stage of the research was to interview CTE instructors. Each interviewee was presented with the interview questions before the actual interview took place. The reason was to overcome the language translation difficulties and let interviewees prepare for the questions. One of the researcher's main concerns was the difficulty of getting the real meaning over to the interviewee, and/or comprehension of the actual intention of the researcher behind the question by the interviewee. Sometimes, translated words do not carry the intended meaning. Since candidate questions of the questionnaire were to be deduced mainly from the interviews of the instructors, early exposure to the interview questions might clearly transfer the message to the interviewee more effectively. The purpose was also, to provide some time for the interviewee to think about his or her blended learning/teaching methods and, course delivery processes, and then ask clarifying questions during the actual interview.

The third stage was the preparation and validation of the questionnaire items. Candidate questions were discussed in a focus group, consisting of three CTE students. Candidate questions of the questionnaire were distributed to the selected participants in a group setting to gather information related to participant views and

experiences. They were also asked to indicate whether questions needed further explanations and if yes, what kind of Turkish translation should be included. The group set up (selection of the members) was selective according to the information collected by the researcher from their academic advisors. All students, participating in the pilot study, were in their third year because this researcher had easy access to these students. One member of the group was an academically successful student, the other was mediocre and the third one was rather socially active and with relatively better grades.

Questionnaires were administered when most or all target students were present at a certain lecture hour. The time and place of a questionnaire administration were decided in cooperation with the instructors.

After administration of the questionnaires to the CTE students, the next step was consisting of four follow up interviews. Interviews were done with one CTE student from each class (2^{nd}, 3^{rd}, 4^{th} and 5^{th}) to find out any other concerns that this research was not able to fully uncover. The purposeful selection of the students was done with the help of co-chair of the CTE Department.

As explained earlier, CTE instructors who were interviewed were purposefully selected from the ones who use blended learning methods in their courses with greater confidence.

Finally, analysis of the collected data during the two main stages was completed. Graphic representation of the data collection process is given in Figure 6 and 7.

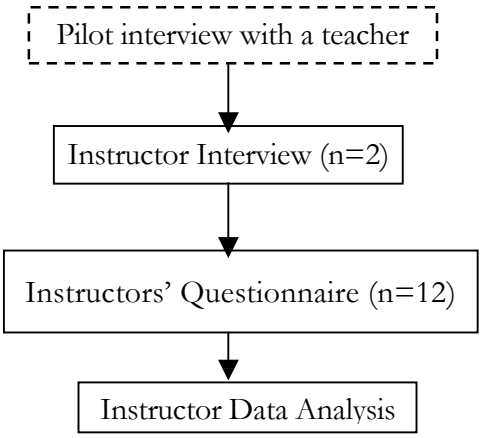

Figure 6. Data collection from instructors

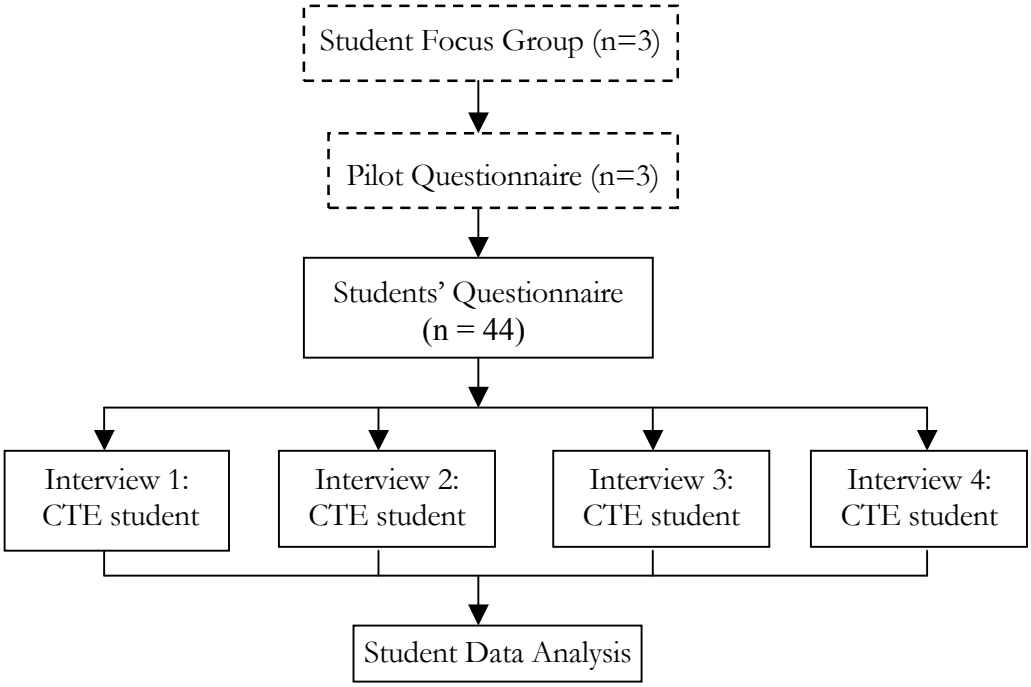

Figure 7. Data collection process from students

Interview questions and the questionnaires that were used in this study are given in Appendix I thru IV.

Pilot work

There were two different pilot studies. The first one was administered before the interviews of CTE instructors took place, and the other was a pilot administration of

the questionnaire and a small-scale focus group study with three purposefully selected students from the CTE Department. Pilot interviews aimed to check the validity and effectiveness of the interview questions and the interview process (e.g. duration, number of questions, comprehension level, etc.). The first pilot interview with a CTE instructor took around fifteen minutes. The candidate instructor was purposefully chosen to represent an instructor who knew various blended learning methods and incorporated Moodle in his courses.

Similarly, pilot testing of the questionnaire aimed to check the validity and effectiveness of the students' questionnaire items (e.g. to find the need for Turkish translations, decide which questions were not clear and which ones needed further explanations, etc.). Pilot questionnaire was given to three CTE students. Students were from 2nd, 3rd, and 4th year students. The researcher inspected students' attendance logs in the AIRS (Academic Information Review System) system and the candidate students were chosen according to higher course attendance rates. A focus group study was made with the students who were given the pilot questionnaire. Discussion was held based on the comprehensibility and effectiveness of the questionnaire items. The discussion period took around 15 minutes.

Data analysis procedures

This research uses qualitative data analysis methods, primarily drawing on the descriptive approach. Supplementary quantitative methods (e.g. mean value calculations and statistical chi-square tests) were used to provide more precision when interpreting the data collected. Part of the study can be described as "descriptive survey research" where the study aims to describe behaviors and to collect people's perceptions, opinions, attitudes, and beliefs about a current issue in

education (Ladico, Spaulding & Voegtle, 2006, p.12). Questionnaire results were summarized by tabulating the individual and total number of responses that participants reporting to each questionnaire item. Then mean values were calculated and interpreted with respect to the question that was studied.

In order to satisfy the first research question, instructors were asked to categorize their teaching methods. The questionnaire provided categories of teaching methods. The five different BL methods that were presented to the instructors were in conformance with the framework that is proposed by Valiathan (2002). The other teaching methods were extracted and categorized with respect to various categorizations that were found in the educational literature. The reader can revisit the data analysis and results chapter, Teacher Questionnaire section of this study for the references used. Instructors' answers were tabulated into a table. Then the same question was asked to the students and their perceptions of the applied teaching methods were tabulated as well. Chi-square test of goodness of fit administered on the actual and expected answers of the students with respect to the instructors' answers to find the consistency between instructors' intended BL methods and students' perceptions.

Later on, structured-interviews with teachers and students were conducted; the reflections were recorded and later on transcribed. To lower the possibility of unstructured answers from open questions of the interviews, interview questions were submitted to the interviewees before the interview took place. This resulted in better articulated responses and made the data analysis easier.

In order to maximize the validity, four different students (i.e. eleven percent of the population) were interviewed. The reliability of the interviews is not considered as

an issue because, first, the time limitation of the present study and unavailability of some of the interviewed students who already graduated, and secondly, as interviewed students grew older their perceptions, opinions and attitudes might have changed by time. The data gathered from the interviews were analyzed content-wise using the transcribed data.

CHAPTER 4: RESULTS

Overview of the study

Richards (2005) quoted the response of Nobel Prize winning physicist Charles Townes elaborating on the question of "what is the purpose or meaning of life? or of our universe?": "These are the questions which should concern us all.... If the universe has a purpose, then its structure, and how it works, must reflect this purpose." Similarly, an analogy can be made for blended learning strategies and applications. If a blended learning application has got a purpose then its structure, its components and how it is applied must reflect this purpose. Consequently, if its purpose of use is clear enough then the learner will easily conceive it and reflect upon accordingly. It was the main starting point of this study to find out; is there really a purpose behind blended learning applications in the CTE department? Are instructors aware of different blended learning methods and are they consciously using them in instruction? And, do pre-service students clearly perceive the applied blended learning method?

Hence, this study is about an analysis of student perceptions and instructor intentions of blended learning applications in the Department of Computer and Instructional Technology Teacher Education of Bilkent University. Questionnaires and interviews were conducted to find out the opinions of CTE instructors and students about blended learning methods and how such applications affect the social relations between students and student-teacher interactions, together with the possible effects of already held levels of computer literacy according to CTE students and instructors.

Table 5

Research Questions and Corresponding Questionnaire/Interview Items

Main Questions	Sub-questions	Instrument	Item Number
What are the Bilkent University's Computer and Instructional Technology Teacher Education Department students' perceptions of blended learning strategies compared to their instructors' intentions?	What blended learning methods are used by the CTE instructors?	Instructors' Questionnaire	Section 1, Question 1
	What are the CTE instructor intentions (academic, social, etc.) of using blended learning methods?	Instructors' Questionnaire and Instructors' Interviews	Section 2, Question 2.1 thru Question 2.12 Section 3, Question 3.1 thru Question 3.3 Interview Questions 4 thru 10, 13, 14
	How are CTE instructor intentions of using blended learning strategies perceived by the CTE students?	Students' Questionnaire	Section 1, Question 1
	How do students respond to the different approaches of blended learning?	Students' Questionnaire and Students' Interviews	Section 3, Question 3.1 thru Question 3.7 Section 2, Question 2.1 thru Question 2.13 Interview Questions 3, 4, 6, 8, 9
Do CTE instructors and students think that blended learning affects social relations between students, and between instructors and students?		Instructors' Interview	Interview Questions 14, 15, 16 Questionnaire Section 2, Questions 2.2, 2.3, 2.11
		Students' Interview	Interview Questions 4, 6 Questionnaire Section 2, Questions 2.2, 2.3, 2.11
Do CTE instructors and students think that computer literacy affect the students' participation towards blended learning applications?		Instructors' Questionnaire	Section 2, Question 13 Interview Question 12
		Students' Questionnaire	Section 2, Question 14 Interview Question 11

Interviews were held in a friendly atmosphere and several topics whether directly related to the research questions or not discussed freely with the instructors and students. There were open-ended questions as well as closed-ended questions. Questions and corresponding instrument items are displayed in Table 3.

Following sections are organized according to the specific research questions. Answers to the respective research questions are summarized under the relevant headings.

What blended learning methods are used by instructors?

In order to find out what blended learning methods were exercised by the CTE instructors; a checklist was prepared to indicate various teaching/learning methods. As can be seen in Appendix III, 12 different teaching/learning methods were extracted from the literature ((Pain, Knottenbelt & Ramscar, 1997); "Teaching and Learning Strategies," (n.d.); Kerres, de Witt, 2003); Huitt, 2003); "ADPRIMA; Instructional Methods Information", 2010); etc.)). Among the listed only five of them are blended learning methods. Remaining seven of them are other teaching/learning techniques that were of interest. The researcher purposefully included other types into the questionnaire because of the fact that not all instructors are using blended learning methods in their courses. The researcher's intention was to let instructors choose freely between both F2F and BL methods, and not to force them to categorize their courses into specific types.

Answers to the first research question "What BL methods are used by the CTE instructors?" are tabulated and frequencies of the teaching/learning strategies or

methods that are used by the CTE instructors are simply added up. The result is depicted in Table 6 below.

Table 6

Answers of the Instructors' to the Questionnaire Section 1, Question 1

Instruction Delivery Method	Selection Frequency (n=12)	Sub-Total
BL-1 (blended learning method for content delivery)	7	21
BL-2 (blended learning method for skill-driven learning)	4	
BL-3 (blended learning method for attitude-driven learning)	3	
BL-4 (blended learning method for competency-driven learning)	3	
BL-5 (blended learning method to integrate multiple media with the appropriate instructional strategies)	4	
F2F-1 (face-to-face method, characterized as narration or lecture) type	8	49
F2F-2 (face-to-face method, characterized as guided discussion) type	7	
F2F-3 (face-to-face method, characterized as role playing) type	3	
F2F-4 (face-to-face method, characterized as brain storming) type	10	
F2F-5 (face-to-face method, characterized as simulation) type	8	
F2F-6 (face-to-face method, characterized as drill & practice) type	6	
F2F-7 (face-to-face method, characterized as case studies) type	7	
TOTAL	70	70

The result of this questionnaire item (Section 1, Question 1) indicated that CTE instructors used a combination of F2F and BL methods while primarily preferring F2F methods rather than BL methods for instructional delivery (the total selection frequency for BL methods is only 21 compared to 49 of F2F methods). They use blended learning methods mostly for asynchronous content delivery (the highest selected BL method is BL-1 with 7 selections). Majority of the instructors indicated that they were using brainstorming methods for teaching/learning (10 selections for

F2F-4). As Wannapiroon (2008) also agrees the same practice to enhance student's problem-solving ability may be done better with blended learning methods for skill-driven learning (BL-2). Because of the reason that BL may extend the time to conduct brainstorming, this extended time may give opportunity to think issues deeper and wider, may even give opportunity to refer to external resources while keeping the benefit of using classmates' ideas. This is why; BL could provide a better medium for brainstorming in instructional settings. Indeed, this approach (skill-driven learning) works best when people are learning content at the knowledge or application levels ("Blended Learning Models" n. d.).

Next preferred course delivery method is the classical face-to-face narration/lecture type and equally chosen is F2F simulations (that describes abstract concepts with evocative concrete real-world examples). The least preferred methods are F2F role-playing (that involves recreating a situation relating to a real-world problem in which participants act out various roles), BL attitude-driven learning and BL competency-driven learning, each item was considered only three times.

Intentions of instructors in using blended learning methods

The Section II of the questionnaire asked about the intentions of CTE instructors of using blended learning methods. This section was composed of 13 questions that are based on a five-point Likert scale from 1 (disagree), 2 (somewhat disagree), 3 (neutral/undecided) to 4 (somewhat agree) and 5 (agree) for all items where participants were asked to check their level of agreement with each statement. According to the instructors' responses, a frequency table is prepared and a mean value is calculated. Overall, a mean value of 5.0 means all the instructors have chosen the "agree" option, 1.0 point means all the instructors have chosen the

"disagree" option. Only the last question was asked to find out the opinions of the CTE instructors whether they think an earlier exposure to ICT in earlier education shows any positive effect on students' participation towards the blended learning applications or not. CTE instructors' answers to the questions of Section II and the summation of the responses are shown in Table 7 below.

Table 7

Intentions of CTE Instructors of Using Blended Learning Methods

Questionnaire Item No. (Section 2)	Intention of the applied blended learning method	Responses (n=12)
Item 2.1.	Delivery method: improved student access to the information resource (accessibility)	4.50
Item 2.2.	Didactic method: student-student collaboration	3.92
Item 2.3.	Didactic method: instructor-student collaboration	4.58
Item 2.4.	Didactic method: participation	3.25
Item 2.5.	Didactic method: flexibility	3.50
Item 2.6.	Delivery method: depth of reflection	3.17
Item 2.7, 2.8, 2.9.	Delivery method: human connection (students have time to more carefully consider and provide evidence for their claims, reluctant/shy students can more easily express their ideas & ask questions	3.36
Item 2.10	Delivery method: human connection (positive effects of social networks in students' use of BL.	2.67
Item 2.11	Delivery method: human connection (relationship with students in online learning is closer & informal than F2F methods)	2.25
Item 2.12	Delivery method: easier course-content delivery for instructor	4.33

Majority of the instructors use blended learning methods because;

- It improves student's access to the information source (Item no. 2.1, average response is 4.50),

- It increases the instructor-to-student collaboration (Item no. 2.3, average response is 4.58),

- It increases the student-to-student collaboration but not at the same degree as instructor-to-student collaboration (Item 2.2, average response is 3.92 compared to item no. 2.3, average response 4.58),

- It makes the delivery of the course content easier (e.g. content distribution through online methods, via video conferencing, etc.). (Item no. 2.12, average response is 4.33).

- It increases the students' contribution to the discussions because of its time and place convenience (Item no. 2.5, average response is 3.50).

For the rest of the questions of Section II, CTE instructors did not have clear ideas about blended learning methodologies (5 questions out of 12 excluding the item 2.13, which is about earlier ICT education, all individual averages are close to 3, respectively (i.e. less than 3.50 and/or above 2.50).

Questions in Section III try to answer whether there are some purposes other than the ones listed in Section I & II when CTE instructors practice blended learning in their courses. CTE instructors did not propose any significant, new or previously-not-stated intention. Therefore, question 3.1 did not reveal any new information in this regard. Question 3.2 asks about whether the CTE instructor is aware that his/her application of blended learning methods is properly conceived by the learners (i.e. CTE students) or not. There are 8 responses (out of 12) to this question and only one instructor think that CTE students are very teacher-driven and class oriented, therefore they are not aware of different blended learning methods that are practiced

by different instructors. One instructor added that only the fourth year CTE students are aware of different blended learning methods, first, second and third year students are not. Hence 7 out of 12 instructors think that, in general, CTE students are aware of different applications of blended learning methods. Question 3.3 asks what can be done to get the students to improve their interaction with blended learning methods provided that the instructor has given a "no" answer to the previous question 3.2 (whether the applied blended learning method is properly conceived by the CTE student or not). One instructor who thinks fourth year students are more inclined to perceive blended learning methods claimed that students become more aware when they start studying about education, educational methods and learning types, which takes place in third, fourth and fifth years. And the other instructor who thinks that CTE students are not aware of the different blended learning methods that are practiced by the CTE instructors' claims that it needs a cultural change within the departmental environment. More departmental effort is needed to increase students' engagement with course content/material outside his/her course, which can be achieved by getting more and more instructors involved in blended learning applications. This may mean that instructors need to be trained more about the potentials of blended learning and application strategies.

Student perceptions of blended learning use in their courses

Section 1 of the students' questionnaire is used to find out students' perceptions of blended learning use in their courses. This part was designed the same as that of Section 1 of instructors' questionnaire, the only difference was that it contained some Turkish explanations for better understanding. That is to say, in order to find out the perceptions of CTE students about what blended learning methods were used by

CTE instructors, the same checklist that was presented to the CTE instructors was also presented to the CTE students. Seven out of forty four students did not prefer to answer this question. This comprises almost 15% of the sample. Which means 15% of the sample did not have any idea or they did not want to indicate what teaching methods they were taught with. 85% of the sample indicated at least one of the teaching/learning methods as the perceived teaching/learning method. According to the CTE students, applied teaching/learning strategies that they thought their instructors used, were shown in Table 8.

Table 8

Students' Answers to the Question 1 of Questionnaire Sec.1

Instruction Delivery Method	Selection Frequency (n=44)	Sub-Total
BL-1 (blended learning method for content delivery)	25	129
BL-2 (blended learning method for skill-driven learning)	27	
BL-3 (blended learning method for attitude-driven learning)	20	
BL-4 (blended learning method for competency driven learning)	25	
BL-5 (blended learning method to integrate multiple media with the appropriate instructional strategies)	32	
F2F-1 (face-to-face method, characterized as narration or lecture) type	23	121
F2F-2 (face-to-face method, characterized as guided discussion) type	17	
F2F-3 (face-to-face method, characterized as role playing) type	15	
F2F-4 (face-to-face method, characterized as brain storming) type	24	
F2F-5 (face-to-face method, characterized as simulation) type	15	
F2F-6 (face-to-face method, characterized as drill & practice) type	11	
F2F-7 (face-to-face method, characterized as case studies) type	16	
TOTAL	250	250

Of the instructional strategies that were used in the courses and as perceived by the CTE students, 51% belong to BL methods and 49% is F2F methods. On the contrary to beliefs of CTE instructors, students think that the BL method that integrates multiple media with the appropriate instructional strategies (BL-5) is the method that is preferred by their instructors. Rest of the BL methods are almost equally distributed except BL-3 (blended learning method for attitude-driven learning), which is identical with the instructors' answers in proportion of choice. Another resemblance with the instructors' choices is the method of brainstorming (F2F-4) and drills and practices (F2F-8). Students' perceptions about the applied methods overlap with the instructors' intentions.

Inline with the main question of this research; to find out whether the students' reported use of instructional methods are in agreement with their instructors' professed use of such methods, a chi-square test of goodness of fit was performed. The results are given below Table 9.

Table 9

Observed and Expected Frequencies of BL Methods (Whole Sample)

	BL method					Total
	BL-1	BL-2	BL-3	BL-4	BL-5	
Instructor (f_o)	7	4	3	3	4	21
Student (f_o)	25	27	20	25	32	129
Student (f_e)	43	24.6	18.4	18.4	24.6	129
$\frac{(f_o - f_e)^2}{f_e}$	7.5	0.23	0.14	2.37	2.22	12.46

f_o : observed frequency of the indicated questionnaire item
f_e : expected frequency of the indicated questionnaire item

The result showed that students' indication of the blended learning instructional methods that they thought are used by their instructors did not agree with those of their instructors', χ^2 (4, n = 129) = 12.46, $p < .05$.

Then, the researcher tabulated the answers of the 4th and 5th year students apart from the rest of the students' population, with respect to the same set of students' questionnaire items. The aim was to know whether 4th and 5th year students' perceptions of the instructional methods agreed with that of their instructors' professed use of instructional methods or not. The data and results of calculations are shown in below Table 10.

Table 10

Observed and Expected Frequencies of BL Methods (4th and 5th Year Students)

	BL method					Total
	BL-1	BL-2	BL-3	BL-4	BL-5	
Instructor (f_o)	7	4	3	3	4	21
Student (f_o)	18	17	12	17	21	85
Student (f_e)	28	16.1	12.4	12.4	16.1	85
$\frac{(f_o - f_e)^2}{f_e}$	3.5	0.05	0.01	1.7	1.49	6.75

f_o : observed frequency of the indicated questionnaire item
f_e : expected frequency of the indicated questionnaire item

The result indicated that 4th and 5th year students' perceptions of the use of blended learning methods agreed with their instructors' professed use of such methods, χ^2 (4, n = 85) = 6.75, $p > .05$.

Hence, as far as the participant students as a whole is concerned, regarding the first research question, there was a significant difference between students' perceptions

and the instructors' professed blended learning methods, as chi-square analysis is revealed.

On the other hand, as a follow-up when the same analysis was performed for the 4th and 5th year students only, the perceptions of the students and the instructors' professed use of blended learning methods did not show any significant difference.

Student response to blended learning use in their courses

The Section II of the questionnaire was to find out the responses of CTE students to the applied blended learning methods. What do CTE students think why an instructor is using a particular blended learning method in his/her course? This section was composed of 14 questions that were based on a five-point Likert scale from 1 (disagree), 2 (somewhat disagree), 3 (neutral/undecided) to 4 (somewhat agree) and 5 (agree) for all items where participants were asked to check their level of agreement with each item. Overall, 5 points mean all students have chosen the "agree" option, on the other hand 1 point means all students have chosen the "disagree" option. According to the students' responses, a frequency table is prepared and tabulated in Table 11.

Section II of the students' questionnaire contains an extra question, which did not have an equivalent item in instructor's questionnaire. The intention of the question 2.13 was to find whether students think that CTE instructors inclined to use online methods for purposes other than educational such as; blended learning methods are a new trend in educational environment or their usages are encouraged by the administration, etc. Answers to this question (instructors think that they are successful when they use blended learning methods in their courses) show a variance

with the students. There are answers in both directions; i.e. some students think that instructors are deliberately using BL methods (e.g. average response of 5th year students was 3.22) and some students think more strongly so (e.g. average response of 4th year students is 4.62). Overall average value of all response was found to be 3.78, which was close to 4.00 (somewhat agree)), which means majority is inclined to think instructors consider themselves successful when they use blended learning methods in their courses.

Table 11

Comparison of Intentions of CTE Instructors of Using Blended Learning Methods and Students' Interpretation of Them

Questionnaire Item No. (Section 2)	Intention of the applied blended learning method	Instructors Responses (n=12)	Students Responses (n=44)
Item 2.1.	Delivery method: improved student access to the information resource (accessibility)	4.50	4.39
Item 2.2.	Didactic method: student-student collaboration	3.92	3.69
Item 2.3.	Didactic method: instructor-student collaboration	4.58	3.88
Item 2.4.	Didactic method: participation	3.25	4.19
Item 2.5.	Didactic method: flexibility	3.50	3.94
Item 2.6.	Delivery method: depth of reflection	3.17	3.55
Item 2.7, 2.8, 2.9.	Delivery method: human connection (students have time to more carefully consider and provide evidence for their claims, reluctant or shy students can more easily express their ideas and ask/answer questions)	3.36	3.96
Item 2.10	Delivery method: human connection (positive effects of social networks in students' use of BL)	2.67	3.97
Item 2.11	Delivery method: human connection (relationship with students in online learning is closer & informal than F2F methods)	2.25	3.39
Item 2.12	Delivery method: easier course-content delivery for instructor	4.33	4.36

Table 11 can be interpreted as students think that instructors use blended learning methods because;

- It improves the student's access to the information source (Question no. 2.1, average response is 4.39).
- It makes the delivery of the course content easier (Question no. 2.12, average response is 4.36).
- It makes students to participate 24/7 without time and place constraints (Question no. 2.4, average response is 4.19).
- Usages of social networks (like Facebook, Twitter, MSN, etc.) positively affect the students' attitudes towards blended learning methods (Question 2.10, average response is 3.97).
- It makes students to provide deeper and more thoughtful reflections and reluctant/shy students to express their ideas easier or ask/answer questions (Average value of Questions 2.7, 2.8 and 2.9 is 3.96).
- It makes students to contribute discussions at the time and place that is most convenient to them (Question no 2.5, average response is 3.94).
- It improves the instructor-student collaboration (Question 2.3, average response is 3.88).

For the remaining of Section II questions CTE students did not have definite ideas about blended learning methodologies (8 questions out of 12 (excluding the question 2.14, which is about the earlier ICT education), average of the responses is close to 3 (i.e. less than 3.50 and/or above 2.50).

As for the comparison of beliefs of the instructors to the understanding (perceptions) of the students about the reasons why teachers' use specific blended learning methods; there are a few discrepancies between students and instructors about usages of BL methods.

- Students do not agree with instructors on the instructors' usage of BL methods for increased instructor-student collaboration (Question no 2.3, students' average value was 3.88 compared to instructors' average value of 4.58).

- Students think more strongly that instructors use BL methods because they (BL methods) make students to participate 24/7 without time and place constraints than the instructors (Question no. 2.4, students' average response was 4.19 versus instructors' average value was 3.25).

- Students think that instructors prefer BL methods because they (instructors) think that students' usages of social networks (like Facebook, Twitter, MSN, etc.) positively affect the students' attitudes towards blended learning methods. In fact, instructors did not think so (Question 2.10, students' average response was 3.97 and instructors' average response was 2.67).

Results of the responses of the students who were interviewed with similar questions can be summarized as follows:

Generally, all students who were interviewed seemed to be aware of and have enough experience and knowledge about the blended learning applications in their courses. They all admitted that online methods that are effectively used in the department are increasing quality of the courses and student satisfactions. For

example a 4th year student said, “Online environment definitely helps to study and learn better... Blended learning methods helps to get better marks, because even when you miss a lecture you know that it is in the Moodle site and you can compensate”. Yet another 5th year student admitted that students start with positive feelings when they see a Moodle sign in a newly registered course in their STARS registration system. All four students have declared that they were 100% aware of the instructor’s intentions of a particular application and the differences in particular applications. But, 4th and 5th year students seemed to have concrete ideas about the blended learning methodologies. When this researcher asked “What does an instructor intend to accomplish when s/he used a blended learning method?” to a 3rd year student, the answer was “some of our instructors deliberately use blended learning methods and try to coach us in that respect because they think we are the future-teachers and we will use such methods when we start teaching profession”. Meanwhile a 4th year student’s answer was “It changes from instructor to instructor. Some of them use it only for content delivery, some of them use it to teach us how to research better (researcher’s note: blended learning for behavior/attitude-driven learning) and even some of them trying to coach and show us how to use blended learning techniques in courses (researcher’s note: blended learning for skill-driven learning)”. The 5th year student answered another similar question “Can you understand the intention of the instructor or are you aware of the strategy in different blended learning applications? “I can, 100%. If it were used by only one instructor we were not able to discriminate the differences, but it is very nice to see different applications”.

On the other hand, even though 2nd and 3rd year students could evaluate different applications they could not criticize and offer better ways of doing the same blended

learning application. But, 4th and 5th year students seemed to put themselves into the instructor's position and commented on instructor's intention and the way particular blended learning method practiced. One of them even made clear their (students) competency in blended learning applications and said "when the instructor does not know how to handle a certain subject s/he tries to deliver it using Moodle in fact s/he could have done it better in the classroom with F2F methods".

Do CTE instructors and students think blended learning affects social relations?

Table 12

Perceived Effect of Blended Learning on Social Relation

Questionnaire Item		Instructor	Student
2.2	BL increases student-student collaboration	3.92	3.69
2.3	BL increases instructor-student collaboration	4.58	3.88
2.11	Instructor-student collaboration is much closer in BL compare to mere F2F methods	2.25	3.39

Although majority of the CTE instructors think that blended learning methods increase the student-student collaboration and instructor-to student relations (see Table 12, Question 2.2 and 2.3, average responses 3.92 and 4.58 respectively), they do not think that usage of online learning is closer and more informal compared to F2F methods (Question 2.11, average response is 2.25). Students are almost inline with their instructors and inclined to think that BL increases student-student collaboration (Question 2.2, average response is 3.69) and instructor to student relations (Question 2.3, average response is 3.88). However, students are not very sure about the intention of the instructor for social relations when using BL methods (Question 2.11, average response is 3.39).

Interviews with CTE instructors and students supported above conclusions about the effects of BL methods on the relations between students and between instructors and students. Both of the interviewed CTE instructors think that when an instructor asks students to collaborate using online methods, such as group assignments, wikis or setting up groups from different sections of similar courses, students willingly accomplish what is asked of them. This suggests that they think appropriate use of BL methods have positive effects on the relations between students. Meanwhile, when the same instructors were asked about effects of BL methods on the relations between instructors and students, similar positive responses were indicated. Both instructors agreed that situations like; when a student was absent at the F2F part of a course or when a student was not able to make use of office hours of an instructor then s/he (student) can easily get in touch with the instructor for specific questions or obtain information using online methods like discussion forums and/or chat sessions, etc.. Yet another given example is that when a student missed a certain F2F meeting with the instructor and s/he asked fellow students about what the meeting was about, it is not always possible to obtain the right information from fellow students. Hence, online parts of BL methods help students to contact the proper person, which in turn improves the relations between students and between instructors and students.

On the other hand, when CTE students were asked to comment on the effects of online methods to relations between students and between students and instructors two out of four interviewees said BL methods improves the relations and student-to-student relations improve more than the instructor-student relations. The other two student interviewees commented, they did not see a noticeable effect.

Do CTE instructors and students think computer literacy affect the students' participation towards blended learning applications?

Table 13

Blended Learning vs. Computer Literacy

Questionnaire Item		Instructor	Student
2.13 / 2.14	Computer literacy positively affects student participation towards BL applications	3.67	3.82

As shown in Table 2.13, instructors' average response to Question 2.13 is 3.67 and it can be interpreted as; although CTE instructors slightly agree that earlier exposure to computers may have positive effects (average response being closer to 4), they are not very sure about it (as the number is also close to 3.0 (neutral/undecided)).

The same question was asked to find out the opinions of the CTE students as well (Questionnaire item number 2.14) , whether they think an earlier exposure to ICT in the earlier education shows any positive effect on the students' participation towards the blended learning applications or not. Students' average response of 3.82, being close to 4 can be interpreted as students think computer literacy positively affects the students' participation to blended learning applications, although CTE instructors are less sure about it.

On the other hand, interviews with instructors revealed a little bit different result. Both instructors with whom separate interviews were done think that earlier education may affect how a student approaches to Learning Management Systems. One of the instructors was very sure about the computer literacy may make the instructor's job easier or more difficult from the point of students' participation into

discussion forums or other collaborative assignments that are given in the blended learning environment. When students did not have earlier computer education then they hesitate to use software tools and are afraid to be unsuccessful for that specific course. Meanwhile, the other instructor asserted that, rather than computer literacy, what is important is the student's acceptance of the computerized tools as one of the components of the course. Hence he did not put much emphasis on the computer literacy as one of the preconditions that have positive effects on the student's participation in the blended learning applications but he did not rule out the possibility that computer literacy may positively affect the student's acceptance of the online part (i.e. software tool) of the blended learning method.

CHAPTER 5: DISCUSSION

Overview of the study

This research examined the types of blended learning strategies that are practiced by the CTE instructors, their intentions of practicing them and the CTE students' perceptions and responses to various blended learning strategies that they experience in their courses, based on the analysis of data from questionnaires and interviews. Effects of blended learning on the social relations among students, and between students and instructors with respect to online awareness were also investigated. As for guidance to future research CTE instructors and students were also asked about their opinions about the influence of computer literacy (=previous experience with computers and Internet) to blended learning applications. Consequently, instructors' applications and students' evaluations and perceptions of blended learning methods that are practiced in the Department of Computer and Instructional Technology Teacher Education in Bilkent University were analyzed.

Similar questions were asked to both sides of the educational life, in-service instructors and pre-service teachers (=students of teacher education), to collect information about the applications of blended learning methods. In order to collect information all CTE instructors were asked to answer a given questionnaire, then two instructors were selected and interviewed to obtain more detailed information. 2nd, 3rd, 4th and 5th year CTE students were given the same questionnaire to find out about their beliefs and thoughts about the blended learning applications in the department. Later on, four students, one from each of 2nd, 3rd, 4th, and 5th year students were interviewed.

This chapter presents the discussion and analysis of the results in relation to the articulations of the existing literature and some pedagogical implications of the study together with suggestions for further research.

Discussion of the findings

As Cooley portrays "You program a robot, you train a dog (or possibly a soldier), but for human beings you provide an educational environment" (as cited in Williamson, Bannister & Schauder, 2003, para. 2). As part of the educational environment, one finds the methods of teaching and learning. Blended learning is one of those methods that is receiving increasing attention. It is considered as one of important methods of teaching and learning among scholars. Blended learning applications bring different course delivery strategies and methods. Any strategy that introduces blended learning needs to be considered carefully in order not to decrease its effectiveness and should be positioned within the broader context of not just attracting, retaining and motivating talent, but also addressing more compelling arguments of different intelligences (Thorne, 2003, p.6).

The present researcher believes that the closer the blended learning methods to satisfy the multiple intelligences of Gardner (1993 and 2006, Chapter 4), the better the learning will be. As more intelligences are addressed using different BL methods, obviously the better the learning will be. For example, with the mentoring of an experienced instructor (F2F exercising); a learner can log onto a networked computer (BL online methods) and access information any time, anywhere and, in the amount of time that s/he has got, thus meeting the critical needs of the learner (personal intelligence). Through the use of Internet, a learner has the opportunity to satisfy his or her intellectual needs that is generally up-to-date and presented in an

instructive manner (logical-mathematical and linguistic intelligences). In addition to the textual information provided, a learner can view, possibly in 3D, graphics, charts, figures, and animations to get a more in depth understanding of the information being studied (spatial intelligence). Most of the time, a learner can even listen to appropriate music as s/he wishes text and/or watches different multimedia content forms (musical intelligence). It is also possible for learners to click on unfamiliar vocabulary items to get not only a definition, but also to hear the correct pronunciation, including stress and intonation. Blended learning also includes the use of audio, video, and digital cameras to record observations in the *natural world* sometimes using computers and network facilities in real-time mode (naturalist intelligence). Mainly F2F meetings and group works but to some degree online discussion forums and chat room applications nurture the interpersonal intelligences. Popular interactive components of blended learning like discussion forums, chat rooms, bulletin boards, etc., provide learners to participate easily and probe for further information and have their questions addressed (intrapersonal intelligence) (Strother & Alford, 2003). Therefore, this researcher believes that any definition of the term "blended learning" is expected to include at least one preferably several components, which ought to exploit above mentioned dimensions of multiple intelligences.

How blended learning methods are administered and how the administered methods are perceived by the learners, are important and cover another important side of the educational environment. This study is concerned with blended learning methods used by instructors and their perceptions among pre-service teachers.

This section will discuss the findings with respect to the research questions. Firstly, when CTE instructors were asked to choose which blended learning strategies they were using, majority of the instructors indicated that they were using F2F brainstorming methods for teaching/learning, although the same practice to enhance student's problem-solving ability can be done better with blended learning methods for skill-driven learning (Wannapiroon, 2008), which may indicate a missing pedagogical knowledge on the teaching side.

Averages of the responses to the question no. 2.1 (blended learning improves the student's access to the information source) and question 2.12 (blended learning makes delivery of the course content easier) are 4.33 and 4.5 respectively indicates that majority of the instructors use blended learning methods like an online communication tool (browser of a web page) where students have online access to at anytime/anywhere basis. In fact, we know that blended learning is a teaching/learning technique that offers more than delivery of course content.

Results of chi-square tests showed that students are not fully aware of the blended learning methods used by their instructors. Hence, the discrepancy surfaces between the instructors and the students about the blended learning method actually used in the classroom. This might be due to different reasons:

- Students were not familiar with blended learning strategies.
- 2nd and 3rd year students had not taken enough number of pedagogical courses to distinguish and evaluate the instructor's approach.
- Instructors might not be consciously applying blended learning methods they thought they were applying and what they had to offer.

- Instructors might not be aware of the fact that they were role models for pre-service teachers at the same time; and that how they taught is informed what they taught.

However, interviews indicated that CTE students, especially 4th and 5th year students are aware of different blended learning applications. They seem to be happier when they take courses involving more and better instructional technology. They can criticize and comment on the applications that they think are inappropriate.

It seemed, as though 2nd and 3rd year students may not be seeing instructors as role models at this stage, yet. They were not imagining themselves in the position of an instructor and consider planning for course delivery in similar situations. As an indication, they did not give precise answers whether they would choose the same course delivery method or not for the same subject. This also implies that 1st and 2nd year students could benefit from pedagogical courses from 1st year on so that students would be more conscious about various teaching/learning methods and consider themselves as future-teachers.

Therefore, this researcher thinks that although CTE instructors have some knowledge about various blended learning methods and their benefits in instruction, some of them need to increase their familiarity with such techniques. Additionally, they ought to take advantage of more features of blended learning into their courses in order to be better role models for pre-service teachers.

Secondly, according to instructor and student responses to survey questions, blended learning seemed to affect the social relations among students and between students and instructors with respect to online awareness. Although majority of the CTE

instructors think that blended learning methods increase both student-to-student (question 2.2. average response is 3.92) and instructor-to-student relations (question 2.3. average response is 4.58), as would be expected they do not think that usage of online learning is closer and informal compared to F2F methods (question 2.11. average response is 2.25). Meanwhile students do not think like their instructors. Although, they accept the positive effects of blended learning methods to both relations (average response to question 2.2 is 3.69 and 3.88 to question 2.3, respectively), they are not very sure that online learning is closer and informal compared to F2F methods (Question 2.11. average response is 3.39).

Therefore, at this point, the researcher can say that blended learning methods and new instructional techniques have positive effects on the students' motivations, attitudes and learning outcomes as indicated by student responses to pertinent questionnaire items of 3.1, 3.2, 3.3, 3.4 and 3.5. Average of all responses to these items are all close to 4. It looks as if BL can bring additional dimensions to the interaction between students and instructors compared to F2F interactions.

Thirdly, the last question was asked to find out the opinions of the CTE instructors and CTE students whether they think an earlier exposure to ICT in the earlier education brings any positive effects on the students' participation towards the blended learning applications. An average response of instructors, being 3.67, can be interpreted as; although CTE instructors somewhat agree that earlier exposure may have positive effects (number being closer to 4) they are not very sure about it (number is close to 3 at the same time). Students somewhat agree with their instructors at this point. Their average response is 3.82, which is reasonably close to instructors' average value.

On the other hand responses to the question 2.10 indicated that instructors are not positively inclined towards the idea that students' use of electronic communication tools (like, Facebook, Twitter, MSN, etc.) result in students being more comfortable and positive users of blended learning methods (average of the responses is 2.67). Meanwhile students think that their instructors use blended learning methods because instructors believe students' involvement with such electronic communication tools result in students being more comfortable and positive users of blended learning methods (average of the students' responses to item 2.10 is 3.97).

Implications for practice

The aim of this study was to find out whether pre-service teachers are aware of the new educational methods like blended learning techniques and online applications (specifically Moodle) in the CTE Department of Bilkent University. Students showed a reasonably high level of awareness. This means in-service teachers should be more careful in their pedagogical methods of teaching because, on the contrary to the belief held by some of them, pre-service teachers of this department are conscious enough to follow what and how the teaching is done by their instructors. It is widely speculated among the instructors of CTE Department that students do not like "teaching" as a profession but they are more inclined to ICT careers.

Section I of the instructors' questionnaire indicated that blended learning methods are not used very often (preferred 21 times out of 70). Therefore, the researcher thinks that CTE instructors could benefit from being trained in pedagogical theories and potential applications of blended learning methods if they plan on continuing teaching pre-service teachers.

Students also admit the improved effects of online methods (Moodle) in their learning process. Learning, when administered appropriately to reflect the purpose, definitely improves the social relations of students even in an "online" community of fellow students. Students agree that better usage of forum-like features improve the student-to-student relations. Therefore, instructors of CTE Department ought to find ways to include such features of Moodle into their blended learning strategies in order to improve student-to-student and even (although not supported by the students but favored by the CTE instructors) instructor-to-student relations.

If we can attribute 2nd and 3rd year students' lack of awareness for the blended learning methods used by their instructors to missing pedagogical knowledge, we can say that they can benefit from more use of blended learning in their courses at the early stages of their education.

Students also commented on the computer literacy and effects of earlier computer education on the computerized online methods (like Moodle) and some of them (based on the information gathered from interviews with students) insisted on the idea that some familiarity is needed in the earlier phases of education. Bilkent University can include some information technology and Moodle experience into common courses (e.g. GE100) , which is given to all first year students in the university.

Implications for further research

The effect of prior experience with technology use was not addressed in detail in this study. Both students and instructors admitted the positive effects of earlier ICT education on the students' participation in the blended learning applications. It is this

researcher's belief that this topic deserves a more detailed study using a better and systematic design in the future.

As stated earlier, there are several topics that are of major interest at the moment. There is a lack of theoretical framework for instruction with blended learning. Information revealed from literature survey indicated that there are issues in blended learning courses where several research studies has been done but some more is still needed especially in the design and development phases of blended learning instructional strategies (Kerres & De Witt, 2003).

This research was carried out in a small department. Therefore, specific blended learning/teaching applications in certain courses; intentions of its instructors and the perceptions of the students who received the same blended learning treatment can be studied deeper in a longitudinal study. This research was carried out with the 2nd, 3rd, 4th and the 5th year students independently, therefore finding out how students' pedagogical consciousness is evolving throughout their educational life vis a vis blended learning can also be researched.

Interviews with the CTE students revealed that some of the Erasmus students of the same department who visited Swedish Universities noted the difference between Bilkent and the universities they visited about the use of F2F teaching methods (personal communication with a 3rd year and a graduated student in Fall 2010/2011 Academic Semester). They preferred blended learning applications in Bilkent University. Accordingly, different teaching/learning methods in other universities may be worth to study as well. Students' pedagogical experiences, perceptions and different manners and styles of the use of blended learning can be questioned, studied and compared across institutions.

Lastly, effects of earlier computer literacy are definitely worth to study for today's instructional technology students. Perhaps, recruitment of students from technical/vocational high schools (computer sections) may be a viable option for instructional technology teacher education departments, and of course, comparison of success rates and effects of earlier computer education between students who come from vocational/technical high schools and others can be studied more systematically as a way of looking into the effects of earlier experience with computers and software tools.

Limitations of the study

The researcher believes that effectiveness of blended learning tools about perceptions, satisfactions, and achievements, together with other effects on the students and other stakeholders need to be examined extensively in different departments of universities. However, such a research exceeds the scope of the present study. Considering the time limit, the scope of this research is restricted to cover only the CTE Department where pre-service teachers are trained. Consequently, the study can only be generalized to institutions of higher education similar to Bilkent University, CTE Department.

Additionally, one component of blended learning is learning management systems. In Bilkent, Moddle is used as the LMS. Like any other LMS, Moddle has certain affordances and limitations in what it can do. Accordingly, instructors' and students' responses in this study are affected and hence are limited by the affordances of Moodle (and/or participants' experiences with it).

Conclusion

The aim of this study was to explore whether pre-service teachers are aware of the intentions of the instructors who practice blended learning techniques in their courses in the CTE Department of Bilkent University. As a consequence of blended learning applications whether student-to-student relations and instructor-to-student relations are being effected or not was also probed.

Various blended learning methods are categorized, instructors and students were asked about them by questionnaires and interviews. Senior students showed a greater awareness than junior students and they also seemed to be more conscious about the way a particular blended learning method is practiced by their instructors.

Secondly, both educators and the students agree on the positive effects of blended learning methods on the improvement of social relations. Although they cannot say that student-to-student and instructor-to-student relations improve tremendously by application of the blended learning method, but relations are positively affected by it.

Finally, this researcher believes that "blended learning" is the instructional method that can bring problem solving, teaming, collaboration and coaching/mentoring that is required by all educational organizations in the twenty-first century, provided that appropriate training is given to the educators of the future. The present researcher intends to disseminate the findings of the study by sharing it with the CTE department administration and faculty in appropriate occasions to further improve the use of blended learning opportunities in the program.

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APPENDIX A: Interview Questions of Instructors

Öğretmen adı soyadı (Name of the Instructor):

Görüşme Tarihi (Interview Date):

1. Kaç yıldır öğretmen olarak çalışıyorsunuz? (How many years you have been teaching as a instructor?)
2. Şu anda "Learning Management System" (LMS) kullanıyormusunuz? (Do you currently use a learning management system?)

   Evet ise, Moodle'mu kullanıyorsunuz? (If yes, is it Moodle?)
3. Ne kadar zamandır LMS kullanıyorsunuz? (How long have you been using a LMS?)
4. LMS kullanımındaki becerinizin hangi seviyede olduğunu tahmin ediyorsunuz? (How would you describe your expertise or skill in using a LMS?)
5. Hangi önemli etkenler LMS kullanmanıza sebep oldu? (What factor was most important in persuading or prompting you to use a LMS?)
6. Derslerinizde niçin LMS kullanıyorsunuz? (Why do you use LMS in your teaching?)
7. LMS'i dersinizde ilk kullandığınızda hangi özelliklerini kullandınız (bugün kullandığınız LMS'den farklı bir ürün olsa dahi)? (What features did you start using the very first time you used a LMS in a class (even if it was a different product than the one you currently use)?)
8. LMS'i, ilk kullandığınız zamana kıyasla şimdi daha fazla mı kullanıyorsunuz? (Compared to when you first started using a LMS, are you making greater use of the LMS in your classes (i.e. using it more frequently or using in more and more classes)?)

Evet ise (If yes);

a. daha fazla sayıda derste mi? Yoksa aynı dersin içinde daha fazla ağırlıklı olarak Moodle'mu kullanıyorsunuz? (what factors persuaded you to increase your use of a LMS in your classes?)
b. eğer daha fazla kullanıyorsanız, sizin dersinizde daha fazla kullanmaya yönelten etkenler nelerdir? (If your usage of a LMS did increase over time what factors made you make this change?)

Hayır ise (If no); eğer zaman içinde daha az kullanmaya başladıysanız, hangi etkenler bu değişikliğe sebep oldu? (If your usage of a LMS did not increase over time (e.g. you began using it less often or in fewer classes) what factors made you make this change?)

9. Şu anda kullandığınız LMS'in özellikleri sizi ne kadar tatmin ediyor? (How satisfied are you with the features of the LMS you are currently using?)
10. Şu anda kullandığınız LMS'in özellikleri, sizin ders verme stratejinizi veya methodunuzu nasıl etkiliyor? (How your usage of LMS features in any way effect your strategy of course delivery?)
11. LMS dışında ders notlarını koymak için başka bir web sayfası ve/veya sitesi kullanıyormusunuz? (Do you place content for classes on web pages that are housed outside of a LMS?)
12. Sizce bilgisayar kullanımının (ve/veya daha önceki eğitimde alınan bilgisayar derslerinin) öğrencilerin LMS kullanılan derslere olan ilgisine etkisi varmı? (Do you think computer literacy has an effect on the attitude of students against LMS courses?)

13. Sizce LMS kullanımının, öğrenme faaliyetleri ile ilgili olarak önemli avantajları nelerdir? (What do you see as being the major advantages of using a LMS in relation to learning activity?)
    a. Ders notlarının daha iyi organizasyonunu sağlar (It organizes your course materials).
    b. Ders proje ve ödevlerinin kalitesini arttırır (It improves quality of course projects).
    c. Ders güvenliği sağlar (sadece derse kayıtlı öğrenciler dersle ilgili bilgileri görebilir) It provides course security (i.e. only enrolled students can see your course materials).
    d. Öğrencilere ek ders malzemelerinin iletilmesini sağlar (It provides additional course materials to students).
    e. Daha kolay "online" sınav ve quiz olanağı sağlar (It provides a convenient online testing or quizzing environment).
    f. Final sınavında notların daha yüksek olmasını sağlar (It increases score on final exam).
    g. Daha pratik ders geçme notu defter sistemi sunar (It provides a convenient grade book).
    h. Dersten gecme notu ortalamasının yükselmesini sağlar (It improves total course grade)
    i. Ders notlarının "online" ortamda incelenmesi öğrenci tarafında daha fazla açıklık sağlar (Review of lecture notes on an online medium gain clarification on students' side).
    j. Ders içeriğinin daha iyi anlaşılmasını sağlar (It improves understanding of content)

k. Ders notlarının “online” ortamda incelenmesi öğrencilerin arkadaşları ile ders hakkında daha fazla fikir alışverişinde olmasını sağlar (Review of lecture notes on an online medium improves students discuss ideas from course with peers).
l. Teknik konuların daha fazla anlaşılmasına yardım eder (It improves understanding of technical aspects).
m. “Online” aracın kullanımı dersle ilgili diğer bilgilere ulaşılmasını arttırır (Usage of online tool increases the access other online materials related to the content of this course).
n. Diğerleri (others)?

14. Sizce LMS kullanımının, öğrencilerin memnuniyeti ile ilgili olarak önemli avantajları nelerdir? (What do you see as being the major advantages of using a LMS in relation to student satisfaction?)
    a. Öğrenciler ile daha fazla iletişimi sağlar (t facilitates greater contact with students).
    b. Birliktelik hissini kuvvetlendirir (It improves feeling of community).
    c. Ders için harcanan zamanın artmasını sağlar (It increased the time spent for study in this course).
    d. Moodle gibi bir “online” aracın bu derste kullanılması öğrencileri tatmin eder (Students are satisfied because this course used online tools (Moodle)).
    e. Öğrenciler diğer derslerde de Moodle kullanılmasından hoşlanırlar (Moodle kullanan başka dersler almaktan mutlu olurlar) (Students would like to have Moodle used in other courses (they will be happy to take another course because it uses Moodle)).
    f. Diğerleri (others)?

15. LMS kullanımı, derslerinizde öğrencilerinizle temasınızı arttırdımı? (Do you think that your use of a LMS in your classes has increased the amount of contact you have with your students?)
16. Sizce LMS kullanımı, öğrencilerin birbirleri ile olan iletişimlerini nasıl etkiliyor? (How do you see the effects of LMS to student-student social interactions?)
17. Eğitmen-Öğrenci iletişimi açısından LMS kullanımının önemli avantajları nelerdir? (What do you see as being the major advantages of using a LMS in relation to student/instructor communication?)
18. Sizce LMS kullanımını dezavantajları nelerdir? (What do you see as being the major disadvantages of using a LMS?)
19. Sizin LMS kullanımınızı neler arttırır veya daha iyi bir hale getirebilirdi? (What changes would improve or increase your use of a LMS?)
20. LMS kullanımınızın, LMS kullanmadığınız döneme göre, öğrencilerinizin ders materyaline daha fazla zaman ayırmalarını sağladığını düşünüyormusunuz? (Do you think your use of a LMS has meant that your students spend more time engaged with the course materials then they did before you started using a LMS?)
21. LMS kullanımınız, derse daha fazla etkileşimli faaliyet koyduğunuz anlamına geliyor mu? (Does your use of a LMS mean that you are able to include more interactive activities in your class or class materials?)

    Evetse, bu etkileşim ne şekillerde oluşuyor? (If yes, what form does this interactivity take?)
22. Tecrübelerinize göre, LMS kullanımı, öğrencileriniz arasında daha farklı öğrenme biçimleri düzenlemenizi sağlıyormu? (In your experience, do LMS provide a way for you to accommodate more diverse learning styles among your students?)

Evet ise, hangi bakımlardan, LMS kullanımı, öğrencileriniz arasında daha farklı öğrenme biçimleri düzenlemenizi sağlıyor? (If yes, in what ways do LMS accommodate more diverse learning styles among students?)

a. Ders malzemelerini değişik formatta sunma fırsatı veriyor (e.g. text, graphics, sound, video) (By giving the opportunity to provide course materials in a variety of formats (e.g. text, graphics, sounds)).
b. Öğrencilere kendi istedikleri hızlarında çalışma şansı sunuyor (By providing opportunities for students to work at their own pace).
c. Ek ders malzemesi kullanma şansı veriyor (sanal benzetimler (simulation), ders kayıtları (cartridges) veya değişik öğrenme tiplerine hitap edebilecek ders paketleri) (By providing the opportunity for the use of additional materials such as digital simulations, course cartridges or course packs that address different learning styles).
d. Diğerleri (others)?

23. İlave edeceğiniz önerileriniz, düşünceleriniz ve/veya yorum ve eleştirileriniz varmı? (Any additional comments or suggestions?)

APPENDIX B: Interview Questions of Students

Öğrencinin adı soyadı: (Student's Name) Sınıfı:(Class)

Cinsiyeti: (Gender) Interview Date: (Görüşme Tarihi)

1. "Blended Learning" nedir? Hakkında ne biliyorsun? (What is "Blended Learning"? What do you know about it?)

   → Evet ise; Nasıl tanımlarsın? (If yes; How do you describe it?)

   ↓ Hayır ise; sinifta ders vermenin yaninda, derslerin, diger online teknikler kullanilarak (Moodle gibi) ogrenciye aktarilmasina ve/veya boylesi bir ogrenim ortami yaratilmasina deniliyor.

2. Şu anda "blended learning" teknikleri kullanılan ders(lerin) varmı? (Do you take courses that bears "blended learning" methods, this semester?)

   → Evet, Hangi methodlar kullaniliyor? (If yes, what methods are being used?)

   ↓

   a. Content delivery (asynchronous)
   b. skill-driven learning: (combines self-paced learning with instructor support to develop specific knowledge and skills
   c. for attitude-driven learning: (combines various event and delivery media to develop specific behaviors).
   d. competency-driven learning: (combines performance support tools with knowledge management resources and mentoring to develop workspace competencies
   e. to integrate multiple media with the appropriate instructional strategies (collaborative tools used to facilitate the transfer of learning (wikis, discussion boards), or adaptive tools used for dynamic content/increased interaction (blogs)).

Hayir ise; daha once aldigin derslerden “blended learning “ile yapilani varmiydi?

Hayir ise; interview bitti..

Evet ise devam;

3. Ogretmenlerin “blended learning” teknikleri kullanarak (Moodle, forum, chat, e-mail, wiki, gibi) ders anlatmalari dogru mu?
4. Sence “blended learning” metodlar ile yaratilan egitim ortami daha iyi ogrenmene yardimci oluyormu?

   Evet ise, “blended learning” kullanımının, öğrenme faaliyetleri (learning activity) ile ilgili olarak önemli avantajları nelerdir?

   a. Ders notlarının daha iyi organizasyonunu sağlıyor
   b. Ders proje ve ödevlerinin kalitesini arttırıyor
   c. Ders güvenliği sağlar (sadece derse kayıtlı öğrenciler dersle ilgili bilgileri görebilir)
   d. Öğrencilere ek ders malzemelerinin iletilmesini sağlıyor
   e. Daha kolay “online” sınav ve quiz olanağı sağlıyor
   f. Sınavlarda notların daha yüksek olmasını sağlıyor
   g. Ders notlarının “online” ortamda incelenmesi daha fazla açıklık (clarification) sağlıyor
   h. Ders içeriğinin daha iyi anlaşılmasını sağlıyor
   i. Ders notlarının “online” ortamda incelenmesi arkadaşlarımla ders hakkında daha fazla fikir alışverişinde olmamı sağlıyor
   j. Teknik konuların daha fazla anlaşılmasına yardım ediyor
   k. “Online” aracın kullanımı dersle ilgili bilgilere ulaşılmasını arttırıyor
   l. Öğrenciler arasında daha fazla iletişimi sağlıyor

m. Birliktelik hissini kuvvetlendiriyor

n. Ders için harcanan zamanın artmasını sağlıyor

o. Moodle gibi bir "online" aracın derste kullanılması öğrencilerdeki tatmin duygusunu arttırıyor, diğer derslerde de Moodle kullanılmasından hoşlanırlar (Moodle kullanan başka dersler almaktan mutlu olurlar).

p. Dersteki aktif katılımı ve eğitmenlerle temasımızı arttıryor.

q. Derste Moodle kullanıldığı için, diğer diğer Moodle kullanılmayan derslere oranla, öğrenciler anlamadıkları şeyler için açıklık getirilmesini istiyorlar.

r. Diğerleri ?

Hayır ise, "blended learning" methodunun dezavantajları nelerdir?

a. LMSlerin inanırlılıkları (reliability) yok

b. LMSler iyi eğitim pratiklerinin bozulmasına sebep olurlar

c. LMSler fonksiyonel değiller yada fonksiyonellikleri limitli

d. LMSler çok fazla biçimseller (structured)

e. Öğrenciler LMS kullanmaktan hoşlanmıyorlar

f. Moodle gibi "online" kaynaklar kullanan bir dersi tamamlamak daha fazla çaba gerektiriyor

g. LMSler esnek değiller, kullanımlarında çok fazla parça var.

h. Kullanımları zor ve zaman alıcı

i. Diğerleri ?

5. "Blended learning" kullanılan derslerde, kullanılmayan derslere göre, öğrencilerde ders materyaline daha fazla zaman ayırdıklarını düşünüyormusun?

6. "Blended learning" kullanılan derslerde daha fazla etkileşimli faaliyet oluyor mu?

Yani, bu etkileşim ne şekillerde oluşuyor?

a. Daha ziyade öğrencilerin kendi aralarında artıyor
b. Daha ziyade öğrencilerle öğretmen arasında artıyor
c. Daha fazla sanal uygulama ve alıştırma
d. Diğerleri ?

7. Ogretmenlerin "blended learning" kullanımındaki becerilerinin hangi seviyede olduğunu tahmin ediyorsun?
8. Ayni dersi kendin anlatsaydin ayni "blended learning" metodunu kullanirdim dedigin oluyormu?
9. Yada bu ders bu metodla anlatılmaz ben olsam boyle anlatmazdim dedigin oldu mu?
10. Lise ve oncesinde alistigin eğitim metodlari ile "Bilkent Uni'deki "blended learning" metodlarini nasil kiyaslarsin?
11. Bilkent Uni'den onceki egitim hayatinda bilgisayarlara ve online kullanima (forum, chat etc.) yatkinligin ve/veya bilgin varmiydi?

Evet ise,

a. Okulda mi ogrendin?
b. Kendin/ailen vasitasi ile mi ogrendin?
c. Hangi methodlar kullaniyordu?
d. Eski bilgilerin ve aliskanliklarinin "blended learning" metodlari kullanilan derslerde yardimci oldugunu dusunuyormusun? Örneğin?

Hayır ise; hazırlık yada birincisi sinifts bu tip araçlar hakkında eğitim verilmesi doğru olur mu? Gerekli midir?

12. İlave edeceğin önerilerin, düşüncelerin ve/veya yorum ve eleştirilerin varmı?

APPENDIX C: Instructors' Questionnaire

CTE Instructors Questionnaire

This questionnaire is composed of three sections. First section is to find out "what blended learning strategies is used by the CTE instructors? The second section is to find out the intentions of CTE instructors of using blended learning methods. And the third section is to find out what the CTE instructors think about "How blended learning is perceived by the CTE students?"

Section 1: Please indicate the strategy or method you are using in your CTE courses. You may check more than one method.

1. I use the following teaching/learning methods in my CTE courses:

□ **Blended learning** for content delivery – asynchronous (is not adaptive to dynamic content) or synchronous (can accommodate dynamic content).

□ **Blended learning** for skill-driven learning: (combines self-paced learning with instructor support to develop specific knowledge and skills).

□ **Blended learning** for attitude-driven learning: (combines various event and delivery media to develop specific behaviors).

□ **Blended learning** for competency-driven learning: (combines performance support tools with knowledge management resources and mentoring to develop workspace competencies).

□ **Blended learning** to integrate multiple media with the appropriate instructional strategies (collaborative tools used to facilitate the transfer of learning (wikis, discussion boards), adaptive tools used for dynamic content/increased interaction (blogs)).

□ **Narration/Lecture** (face-to-face): (allows for transfer of learning through mere discourse and declaration of knowledge. When interaction is available, it allows for reinforcement of behavior, spontaneous questioning, dialogue, and social interaction with immediate feedback).

□ **Guided Discussion** (face-to-face): (synchronous and dialectic learning environment through the spontaneous and free-flowing exchange of information. Encourages active, participatory learning that supports knowledge transfer through dialogue. Students may discuss material more in-depth, share insights and experiences, and answer questions).

□ **Role Playing** (face-to-face): (involves recreating a situation relating to a real-world problem in which participants act out various roles. Promotes an understanding of other people's positions and their attitudes as well as the procedures that may be used for diagnosing and solving problems).

□ **Brainstorming** (face-to-face): (brainstorming is a valid and effective problem-solving method in which criticism is delayed and imaginative ways of understanding a situation are welcomed, where quantity is wanted and combination and improvement are sought. Brainstorming can occur with individuals or in a group setting, and involves generating number of ideas in order to find an effective method for solving a problem).

□ **Simulation** (face-to-face): (describes abstract concepts with evocative, concrete real-world examples).

□ **Drill & Practice** (face-to-face): (repetition of a task or behavior until the desired learning outcome is achieved. Allows for transfer of knowledge from working memory to long-term memory).

□ **Case Studies** (face-to-face): (a problem-solving strategy similar to simulation that works by presenting a realistic situation that requires learners to respond and explore possible solutions).

Section 2: Please answer the following questions.

If you do not use blended learning methods in your courses please skip this section and forward to Section 3.

Please indicate your opinion on the scale. The midpoint is when you feel neutral/undecided about the statement.

2.1. I use blended learning methods because it improves the student 's access to the information source.

Agree	□	□	□	□	□	Disagree
	5	4	3	2	1	

2.2. I use blended learning methods because it improves the relationship between student-to-student collaboration.

2.3. I use blended learning methods because it increases the relationship between instructor-to-student collaboration.

2.4. I use blended learning methods because students can participate 7/24 (because time and place constraints are removed).

2.5. I use blended learning methods because students can contribute to the discussion at the time and place that is most convenient to them.

2.6. I use blended learning methods because I am able to reach the discussion depth that I would like to.

2.7. I use blended learning methods because learners have time to more carefully consider and provide evidence for their claims.

2.8. I use blended learning methods because learners provide deeper and more thoughtful reflections.

2.9. I use blended learning methods because reluctant/shy students can more easily express their ideas and ask/answer questions.

2.10. I use blended learning methods because experience in the use of electronic communication (facebook, twitter, msn, sms messaging, etc.) leads to greater social trust among the students, resulting in students being more comfortable and positive users of blended learning methods.

2.11. I use blended learning methods because my relationship with my students in online learning is much close and informal compared to mere F2F methods.

2.12. I use blended learning methods because it makes delivery of the course content easier.

2.13. Earlier exposure to ICT in the secondary education shows positive effect on the students' participation towards the blended learning applications.