A DESIGN BASED RESEARCH ON THE USE OF A BLENDED LEARNING
ENVIRONMENT

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# ABSTRACT

**A DESIGN BASED RESEARCH ON THE USE OF A BLENDED LEARNING
ENVIRONMENT**

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The purpose of this study is to examine and describe student and instructor experiences and
perceptions of course design, and identify the critical issues regarding the use of a blended
learning environment. A design based research (DBR) framework with qualitative
approaches was carried out by collecting data from an undergraduate course offered to
sophomores. The primary approach was phenomenology using the lens of heuristic inquiry.
Interviews, questionnaires, documents, observation notes, instructor diary, and weekly
reflection reports were the main data sources. Data were collected in three periods:
preliminary study, pilot study, and actual implementation.

The results of instructor experiences revealed that instructor considerations for the analysis
period centered on needs and context. The design and development considerations centered

on pedagogical approach, course materials and documents, course organization, interaction, and instructor-student roles. The enablers (benefits and opportunities) of the implementation period included arousing student interest and participation potentially more, having flexibility, saving time, tracking student progress more easily, and increased interaction, collaboration, and communication opportunities. The barriers (challenges and limitations) were increased workload, difficulties related to the course and time management, overlaps, and creating harmony among F2F and online environments. The students mentioned interaction and communication opportunities, increased motivation, opportunity to voice opinions, and reinforcement of learning as enablers of the blended learning environment. The barriers were increased workload, cultural and technical barriers and dependability of environments. The critical issues were found to be context, pedagogical framework, instructor competency, and technical issues.

It can be concluded that use of blended learning environments can be regarded as a paramount initiative for the higher education institutions by maximizing the enablers of both environments but also has its unique barriers to consider. The results also implied that it is the decisions on the instructional design approaches for creating balance in the course activities that is critical to blended learning environment designs.

Keywords: Blended Learning Environment, Instructional Design, Enablers of Blended Learning, Barriers to the Blended Learning

# ÖZ

## KARMA ÖĞRENME ORTAMI KULLANIMI ÜZERİNE TASARIM TABANLI BİR ARAŞTIRMA

Gedik, Nuray

Doktora, Bilgisayar ve Öğretim Teknolojileri Eğitimi Bölümü

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Bu çalışmanın amacı karma öğrenme ortamı tasarımına yönelik olarak öğrenci ve öğretmen deneyimlerini ve algılarını incelemek ve bu süreçteki kritik hususları belirlemektir. Tasarım tabanlı araştırma deseni kullanılan çalışmada üçüncü sınıf üniversite öğrencilerinden veri toplanmış ve nitel yaklaşımlardan yararlanılmıştır. Temel araştırma deseninde olgubilim çalışmalarındaki sezgisel araştırma yaklaşımı benimsenmiştir. Görüşmeler, anketler, dökümanlar, gözlem notları, öğretmen güncesi ve haftalık yanıtıcı günceler temel veri kaynaklarını oluşturmaktadır. Veriler ön çalışma, pilot çalışma ve uygulama olmak üzere üç dönemde toplanmıştır.

Öğretmene ait verilerin analizi sonucunda karma ortam analizi sürecinde ihtiyaç ve öğretimsel şartlar üzerinde durulurken, tasarım ve geliştirme sürecinde pedagojik yaklaşım, ders materyalleri ve dökümanları, ders organizasyonu, etkileşim ve öğretmen ve öğrenci rolleri üzerinde durulduğu ortaya çıkmıştır. Uygulama döneminde karşılaşılan kolaylıklar öğrencinin ilgi ve katılımını potansiyel olarak artırma, esneklik, öğrenci gelişiminin kolay takibi, artan etkileşim ve iletişim olarak sıralanmıştır. Zorluklar ise iş yükündeki artış, zaman yönetimi ve ortamlar arasındaki çakışmalar olarak belirtilmiştir. Öğrenciler açısından karma öğrenme ortamı motivasyonu artırmış, iletişim ve fikirleri özgürce ifade edebilme fırsatını vermiş ve öğrenmeyi pekiştirici bir ortam sağlanmıştır. Yaşanan zorluklar ise iş yükündeki artış, kültürel ve teknik sıkıntılar olarak belirtilmiştir.

Çalışma sonunda bulunan kritik hususlar ortam, pedagojik çerçeve, öğretmen yeterliliği ve teknik konulardır. Sonuç olarak karma öğrenme ortamlarının sunduğu kolaylıklarla yüksek öğrenimde önemli bir yaklaşım olabileceği, ancak aynı zamanda kendine özgü engellere sahip olduğu ifade edilebilir. Ayrıca karma öğrenme ortamı tasarımının diğer öğrenme ortamlarından en önemli farkının kullanılan ortamların dengesini kurabilecek tasarım süreçleri içermesi olduğu öne sürülebilir.

Anahtar kelimeler: Karma Öğrenme Ortamı, Öğretim Tasarımı, Karma Öğrenme Olanakları, Karma Öğrenme Engelleri

*To my parents:*

My Father, Gülali Temur, the biggest hero of my world

My Mother, Gülfikar Temur, the strongest woman ever

# ACKNOWLEDGEMENTS

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# CHAPTER 1

# INTRODUCTION

This first section begins with background information into the problems and issues of the research study. It continues with the purpose of the study, significance of the study, and research questions. Related terminology list including the terms and concepts used in the study is given next. It ends with the limitations of the study.

## 1.1 Background of the Problem

The recent developments in the technological advances and information and communication technologies (ICT), and the societal transformations altered the way people communicate, interact, and are taught. The advent and exponential growth of the Internet resulted in new trends and uses of media in the creation of learning environments in educational settings. Consequently, the learning environments are altered dramatically in terms of new opportunities and challenges to design, develop, and implement effective instruction.

Considering the Internet as a medium of instruction, there arises the concern of how media, technology, and learning environments affect instructional processes and instructional design (ID) considerations. The use of media and technology for educational purposes has been a matter of interest in Instructional Technology since the emergence of the field (Gagne, 1970; Saettler, 1990). Technology is a term used differently in education. There are views that regard technology in the context of media with a focus on tools (e.g., Head, Lockee, & Oliver, 2002), whereas there are the views that support it as an application of science knowledge in the solution of problems (e.g., Anglin, 1995; Saettler, 1968). A learning environment is the place that includes communication media to interact with students (Gagne, 1970) and is regarded as an alterable variable of education

(Chandra & Fisher, 2009). ID was developed in "along separate but converging pathways" with instructional media (Newby, Stepich, Lehman, & Russell, 2006, p. 282).

When the history of Instructional Technology is traced, one can come across with a number of studies on the use of media and technology in instructional environments (Gagne, 1987; Heinich, 1995). Studies investigated the effect of media and technology in learning with a comparison of face-to-face (F2F) and online (or computer-mediated or computer-based) learning environments. While these environments were suggested to be considered in the framework of "delivery mode" (Head et al., 2002, p. 264) or "modes of instruction" (Gagne, 1970, p. 367), they were mainly regarded in the context of media in the comparison studies. One of the most popular research studies, named also as the "No Significant Difference Phenomenon", has resulted in discussions on media use in learning and made the effect of media questionable. It revealed that the effect of media (e.g., hypermedia) offers no significant difference on the learning outcomes than that of the traditional way (Russell, 1999). Another review report by Phipps and Merisotis (1999) revealed similar results, which said student learning outcomes do not significantly differ for distance education and traditional classroom settings. This issue also calls for the media-method debate between Clark and Kozma. Clark (1983, 1994a, 1994b) asserted that media places no difference on learning but serves as a medium only. Responding to this idea, Kozma (1991, 1994a, 1994b, 2003) asserted that media has a vital role in learning. In a recent meta-analysis report from US Department of Education, however, it was found that students performed better in online learning environments compared to F2F environments on average (Means, Toyama, Murphy, Bakia, & Jones, 2009). In a sense, these arguments might be deemed parallel to questioning the place of learning environments in learning, considering media and methods as components of a learning environment. Therefore, similar arguments can be made for the role of different learning environments in learning. All of these arguments, however, are still questionable and has no certain answers. Studies still take place to investigate the effects of various media, methods, and learning (or delivery) environments on learning.

Parallel to media studies are there ID studies for the best approaches for designing, developing, and implementing instruction in different learning environments. Although the major emphasis for ID processes was given on methods, principles, and theories (with media and technology placed only in the specific phases in an ID process to ponder), in

the literature can be found studies proposing specific ID models for different learning environments (e.g., instructional model on e-learning by Alonso, Lopez, Manrique, & Vines, 2005; FID$^2$GE model on game based environments by Akilli & Cagiltay, 2006)). These studies can remark the endeavors for creating and understanding the link between learning environments and ID processes.

Approaching the issue in higher education context, one can see the wide use of online courses and online programs in the last decades as a trend of the use of new learning environments with new media and –somehow- new methods. Institutions increasingly tend to seek ways to adapt and use online and distributed systems in their organizations (Carr-Chellman, 2006). However, increasing use of the online environments does not mean to demise the opportunities that F2F instruction provides. F2F environment is still regarded a rich medium for its potential in intensive interpersonal and interactive communication and for building social relations. After their review on studies on the effectiveness of distance education in higher education context, Phipps and Merisotis (1999) concluded that the human factor in higher education would not be replaced by technology. Although the role of media in learning is still in question, studies show that use of multiple modes or channels of communication, multimedia, and information delivery environments offer learners and IDers diverse ways for learning and facilitating instruction (Moore, Burton, & Myers, 1994). Bates and Poole (2003) described the role of media and technologies in education by the following statements (p. 51):

> The more ways we can learn about a subject or topic, the more deeply we are likely to understand. Hence one immediate advantage of using different media and technologies is that they allow us to represent the world in different ways… Learning through technology is not necessarily better or worse than face-to-face education; it is though, different.

This difference is said to be taken into consideration while designing a learning environment based on the context and purpose of using the technology and media. Therefore, the question becomes not whether or not to use online or F2F as the delivery medium, but when and how to use it. Hence, it can be argued that instructional considerations for ID become critical for the identification of these concerns.

With the integration of F2F learning experiences with online learning experiences, a new term has emerged as "blended learning", which has piqued the interest of researchers and

educational institutions looking for the most effective options for learning in order to benefit from the opportunities of the delivery of both online and F2F instruction. Simply put, blended learning is defined as the integration of F2F learning experiences with online learning experiences (Graham, 2006). Therefore, blended learning provides various benefits "over using any single delivery medium alone" (Singh, 2003, p. 53). In higher education context, blended learning is regarded as an "evolutionary transformation" (Garrison & Vaughan, 2008) with the availability of Web-based systems in universities and by meeting the needs for more interaction with students in large classes and more flexible learning environments in terms of economic and administrative considerations (Bates & Poole, 2003). The 2009 meta-analysis of US Education Department reported the results of the comparison of blended learning with F2F instruction as the following: "Instruction combining online and face-to-face elements had a larger advantage relative to purely face-to-face instruction than did purely online instruction" (Means et al., 2009, p. xvii).

Focusing on the optimal use of F2F and online environments, the initial concern in the design of blended learning environments becomes the consideration of how to find the balance of these environments in the context of one learning environment. The decisions on the use of media is not changed by blended courses, but it is instructional design decisions that is changed (Ely, 2003). As already highlighted by Simonson, Smaldino, Albright, and Zvacek (2009), instructional design needs to address all aspects of an instructional (or learning) environment which is described as "a system, a relationship among and between all the components of that system-the instructor, the learners, the material, and the technology" (p. 126). Therefore, in the instructional design considerations of blended learning environments, it is expected that all these components are taken seriously.

Considering the tool notion as part of a learning environment, what McLuhan asserted raises the concern of whether ID is a process that shape the tools and technology to be used or whether tools and technology in a learning environment shape the ID process: "we shape our tools, but then our tools shape us" (cited in Dempsey & Van Eck, 2007, p. 289). This is a challenging concern in the blended learning environment design and implementation processes.

Pedagogical approaches in the instructional design considerations have considerable impact in the success of a learning environment. The pedagogy of a learning environment needs to be supported by the features of the environment. Appropriate for any learning environment, Merrill's 'first principles of instruction' provides IDers with a prescriptive and design oriented framework (Merrill, 2002, 2007).

When online technologies become part of courses, it is expected that the design considerations are altered since they have their unique characteristics (Palloff & Pratt, 2007) as well as "daunting challenges" (Garrison & Kanuka, 2004, p. 100). For effective, efficient, and engaging ($e^3$) learning (Spector & Merrill, 2008) in blended learning environments, quality course design is necessary (Dziuban, Hartman, Juge, Moskal, & Sorg, 2006). That is, when the traditional F2F and online environments are used together for a learning environment, the question arises for how the design considerations are affected with these characteristics as well as what issues emerge in the implementation. The background concern of this study emerged with these questions.

## 1.2 Purpose of the Study

The purpose of this study was to examine and describe student and instructor experiences and their perceptions of course design regarding the use of blended learning environment. The analysis, design, development, and the implementation processes of the course were investigated in depth to understand the events from the instructor's perspectives and experiences. Student experiences in the implementation process and their perceptions on these experiences were also sought. More specifically, this study strived to reveal and understand the enablers and barriers of the use of blended learning from instructor's and students' perspectives and hence identify the important elements of designing blended learning environments.

Two terms are critical in the focus of this study: experience and perception. When the term "experience" becomes the main focus, criticisms arise on its appropriateness to the educational use with epistemological objections such as offering inappropriate data, being too holistic, or insufficient analytical term for inquiry (Clandinin & Connelly, 1994). The researcher of the study supported the idea that

The social sciences are concerned with humans and their relations with themselves and their environments, and, as such, the social sciences are founded on the study of experience. Experience is, therefore, the starting point and key term for all social science inquiry" (p. 414).

In conducting this research of a learning environment that was designed in a blended approach, the initial idea was to understand the participant experiences and perceptions with the main focus of: "re-creation of the lived experience, that is, full and complete depictions of the experience from the frame of reference of the experiencing person" (Moustakas, 2000, p. 264). For this reason, participant perceptions derived from their experiences in the use of blended learning environment was sought.

The second term, "perception", is a broad term having a cognitive dimension. Approaching from Husserl's phenomenology, Sokolowski (2008) described perception as an activity-based phenomenon more than the impressions taken out of experiences, and explicated the perception of a tree as follows:

> To perceive a tree is not simply to receive a series of sensory impacts and to construct a mental model of the thing that is behind them; to perceive a tree is to move around it and to see it from many angles and in many illuminations, to touch it, to hear it rustle in the wind, to smell its scent, and so on. (p. 206)

For this reason, perception involves active motion and exploration and supplies the source for knowledge of a phenomenon (Moustakas, 1994), which further enables to reach at singular judgments to move to universal ones (Kockelmans, 1967, cited in Moustakas, 1994). The main aim to collect the perceptions of participants in the current study was to get close to the phenomena of blended learning experience and hence have multiple perspectives into the issues in instructional design considerations. That is, a conceptual understanding into blended learning and practical design of blended learning environments were the critical issues that were aimed in the study. The final aim in investigating a real setting for the processes of course design and learning in a course with the use of blended learning environment was to reveal prescriptions that can guide future efforts in the design of blended learning environments for similar contexts.

## 1.3 Significance of the Study

Despite its growing popularity, blended learning remains a relatively new concept in the field of Instructional Technology. There is a need for researchers to explore the impact

and design of blended learning in achieving more meaningful learning experiences (Bates & Poole, 2003; Bliuc, Goodyear, & Ellis, 2007; Garrison & Kanuka, 2004). As Dede, Whitehouse, and L'Bahy (2002) asserted, the results of the comparison studies of single medium all lead to no significance difference phenomena. There is a need for more studies to investigate learning and teaching in the multiple use of media and learning environments. With an understanding of what is going on in a blended learning environment design and the perceptions of the participants, this study can contribute to a much-needed knowledge for successful design and delivery of blended learning environments that use F2F and online learning environments jointly.

According to Reigeluth (1999), designers need to be provided with prescriptions on the use of technology in learning environments for effective instruction. The information provided by the outcome of this study can provide insight into the dynamics of designing a blended learning environment by presenting the experiences as naturally occur in a blended learning environment, and hence potentially help instructors and course designers to identify the critical elements in creating a blended learning environment, which can offer certain prescriptions for practitioners. These prescriptions were also regarded as key considerations in learning effectiveness and student satisfaction dimensions identified by Sloan Consortium in blended learning research organizing framework (Graham & Dziuban, 2008).

In the blended environment, it can be presumed that when the two environments are integrated to the learning setting, the barriers of each environment can be diminished with the availabilities of other. This study aimed to investigate a blended learning environment to reveal if the practice supports this expectation. With this scope, the results of this study can also be used by readers as a vicarious experience in discovering the meaning on designing a blended course by revealing what is happening in the context of a learning environment from the lens of an instructor and students. By identifying the enablers and barriers, the study can provide designers, instructors or students with insight into eliminating the potential barriers for their settings as well as identifying the strengths of the learning environment to maximize the benefits (Wray, Lowenthal, Bates, & Stevens, 2008).

It is hoped that this study might contribute to existing literature generating suggestions on how to integrate online components into a teacher education F2F course and redesign it. With this scope, the results of the study can provide baseline information of the preferences of students on the components or instructional elements of a blended learning environment by revealing their perceptions on the current blended learning design. It can also serve as a blueprint on how media and technology can be integrated in a teacher education course in the context of blended learning design for not only local practices but also universal ones.

This study also serves as an application of blended course design with Merrill's first principles of instruction (Merrill, 2002, 2007). With this scope, the study acts as an example of using the principles in a blended course implementation in the context of higher education. Although the study is limited in a sense of a particular design with a particular group of participants, the aspects of the approaches used in the design, development, and implementation of blended learning environment could be used in other educational settings.

It is believed that it is essential to understand what it takes to design a blended learning environment and learn student perceptions on the use of blended mode for their courses. This study is also believed to contribute to existing literature by offering a design based research study example for such a need. Hence, it can serve as an application to the call for instructional designers to make use of design research (Reeves, Herrington, & Oliver, 2004) that address challenging problems of practice (Wilson, 2004). The use of design-based approach helps researchers develop a cherished body of knowledge on the theoretical and design ideas that was included in the use of interventions (Joseph, 2003). It can also foster the "relevance and meaningfulness of instructional design" as van den Akker and Kuiper suggested in the book chapter on research designs (Ross, Morrison, Hannafin, Young, van den Akker, Kuiper, Richey, & Klein, 2008, p. 747). Consequently, not as a primary but concluding aim, it is hoped that this study contributes to the current literature by serving as an exemplary use of design based research (DBR) for blended learning environments.

**1.4 Research Questions**

1. What are the instructor's experiences while designing a course in a blended learning environment?

    a. What are the considerations during analysis?
    b. What are the considerations during design and development?
    c. What are the enablers of the use of blended learning environment during implementation?
    d. What are the barriers of the use of blended learning environment during implementation?

2. What are the students' experiences on the enablers and barriers to learning in a blended learning environment?
    a. What are the students' perceptions of the enablers to learning in a blended learning environment?
    b. What are the students' perceptions of the barriers to learning in a blended learning environment?
    c. What are the students' perceptions of the necessary conditions for learning in blended learning environments?
3. What are the critical issues to the use of a blended learning environment?

**1.5 Terminology**

*Learning environment*: The context and setting in which instruction takes place.

*Face-to-Face learning environment:* An instructional environment that takes place in a classroom where the instructor and students are present at the same time. In the study, the F2F instruction meant traditional classroom instruction in which students and course instructor met once a week.

*Online learning environment:* The instructional environment that uses online technologies. In this study, it denoted an LMS to deliver online portion of the course.

*Blended learning:* The integration of classroom face-to-face learning experiences with online learning experiences.

*Analysis*: The initial phase of designing instruction, which includes an investigation on needs, content, context, and learners.

*Design and Development:* Second phase of designing instruction, which includes the design and development of course documents, materials, and resources.

*Implementation*: The third phase of designing instruction, which puts the design and development considerations into practice for a course implementation period.

*Enabler*: The benefits and opportunities as emerge in attaining a goal. In this study, enabler is used as a term to denote the benefits and opportunities that emerges in the implementation of a blended learning environment.

*Barrier:* Issues that emerge as challenges in attaining a goal. In the study scope, barrier is used to refer to problems and challenges that instructor and students faced in the implementation of blended learning environment.

## 1.6 Limitations

This study is limited to the participants of the study included 40 students who enrolled CEIT 209 course in the fall 2006, peers attending as observers, and the course instructor as the course designer that semester who was also the researcher in this study. In addition, validity of this study is limited to the validity and reliability of the instruments used in the study as well as reflexivity of the researcher for the experiences gained. The validity is also limited to the honesty of the participants.

There is also a set of limitations regarding the focus of the study. First, as Oliver and Trigwell (2005) suggested, the student experiences may not be the same with the intentions of the course designer in terms of the blended approach. That is, the perceptions of the students on their experiences may differ from the instructors' perspectives in terms of how they perceive the 'blend' of the blended learning environment. Second, the experiences and perceptions of the learning environment may differ for different groups of students and instructors. Therefore, the study is limited to the perceptions and experiences of the particular study participants. The instructor was also the instructional designer of the course, which can limit the findings for instructional design and instructor experiences

aspects by revealing findings from the perspectives of one person. Another issue is related to the design focus. The design processes that were investigated are limited to analysis, design and development, and implementation processes, but excluded the evaluation process.

Another limitation of the study stems from the researcher role that was also a participant of the study as an instructor. Although this limitation tried to be minimized by using data and methods triangulation, having peer reviews, and having expert opinions to guide her in all processes, researcher effect cannot be excluded from the study.

# CHAPTER 2

# REVIEW OF LITERATURE

This chapter presents a discussion of related literature in the scope of the study. It included four main sections of prominence of computer based technologies in education with a subsection on Turkish higher education context, blended learning in general, design of learning environments with a subsection of design of blended learning environments, and first principles of instruction.

## 2.1 Prominence of Internet-Based Technologies in Education

Recent developments in the ICT have led educational institutions and educators plan and use these technologies in their place. The main capabilities of these technologies include building and supporting of collaborative and social learning environments which were described as a "gateway to resources, collaborative learning and individual achievement" (Tam, 2000, p. 57). With its promise to change the way people gather and use information (Crossman, 1995; Rosenberg, 2001), the Internet has impacted education in great (Bates & Poole, 2003). Different terminologies with different applications have become in use for such implications: online learning, Web-based course, online degree program, e-learning, virtual learning, and online class are a few to name. In the scope of this study, the terms online, e-learning, and web-based will be used as concepts denoting instruction via Internet-based technologies.

The meaning of learning does not change with the new technologies and methods (Klein, Spector, Grabowski, & de la Teja, 2004), but has new forms for delivery mechanisms. Klein et al (2004) advocated their ideas on new educational technologies and their place in learning as the following (p. 7):

... Educational television did not replace the teacher. Computer-assisted learning did not make classroom instruction unnecessary. Web-based instruction is not resulting in dramatically improved learning outcomes. ... new technologies do provide new ways to support learning and opportunities for different kinds of learning activities.

Focusing more on the technology rather than pedagogy were criticized by a number of researchers (e.g. Cagiltay, 2001; Molenda & Sullivan, 2003; Wiske, 2003) in using the technologies in education or training. One argument for the use of technology in education in terms of ID is a well-known critic by Cohen and Ball (1990) as "new wine was poured, but only into old bottles" (p. 334). Congruent with this idea, another argument placed emphasis on the rush into technology before pedagogy in the training setting by Zenger and Uehlein (2001) as: "We certainly aren't first to observe that in the rush to e-learning, the emphasis has been largely on the *e* and not the *learning"* (p. 60).

While online learning is perceived as a concept that is likely to be an inevitable part of education in present and future (e.g., Taylor, 2002, Woodhouse, 2001), it is also perceived as a passing trade by some researchers with criticisms (e.g., Noble, 1999). Whilst the issue remains vague, it is clear that there is a common tendency by institutions for not falling behind (Carr-Chelman, 2006). Dempsey and Van Eck (2007) emphasized the role of IDers at this process with the following statements (p. 297):

> Brick-and-mortar institutions such as universities and resident training centers in particular are feeling the heat. Universities, perhaps for the first time, are finding themselves vulnerable to direct competition from private industry. At the same time the emand and reward structures has become more associated with production and less with service. Thus, designers are seen as more critical to the needs of organization than in earlier years.

Although authors described the role of these IDers as specific groups responsible for the course design and development processes, this role can be carried out by the course instructors as well, since they have "interchangeable" roles (Dick, Carey, & Carey, 2001, p. 12). When moved from F2F to online, there are challenges that instructors or IDers face including adjustment of their model of instruction (Crawley, Fewell, & Sugar, 2009; Grosse, 2004; Simonson et al., 2009; Willis, 1994) or shifts in beliefs and methods (Hannafin, Hill, Oliver, Glazer, & Sharma, 2003), time allocation (Lorenzetti, 2004, Palloff & Pratt, 2007), and support infrastructure (Simonson et al, 2009) are a few to name. In their study of instructor experiences in transferring from F2F to online, Crawley et al (2009) found that lack of resources, highly interactive nature of online environment,

more engagement and activity, and extended intellectual engagements were the difficulties that the instructor faced.

In their article on the key ID ingredients for distance learning, Zheng and Smaldino (2003) addressed five issues that were also cited in the ID literature as: learner considerations, content considerations, instructional strategies, distance education technology characteristics, and evaluation. What is most noteworthy of this article in the scope of this study is its emphasis on distance education technology characteristics. Emphasis on media and learning environments were also given in other literature as well. Simonson et al (2009), for example, argued that environment becomes a challenge for instructor in shifting from F2F classroom to online to distance learning settings. In this shift, the instructor needs to consider what type of resources are available, what types of setting considering the place and time shifts (same place, different place, same time (synchronous), different time (asynchronous) dimensions) are available.

Time spent for the design and implementation of an online classroom for the instructor was mentioned a lot in the literature. According to Palloff and Pratt (2007), instructors inevitably spend considerably more time in their first course delivery than the third or more delivery of the same course. What is more, time spent for the design and delivery of online courses are two or three times greater than a F2F course design and delivery. Based on their online experience with a graduate class which was normally delivered F2F, they compared the time needed for online and F2F delivery preparation, delivery time, and follow up time. The results are given in Table 2.1.

In the design of online learning environments, Dabbagh (2004) proposed a three-component model that work collectively as triad (Figure 2.1). The components of the model include pedagogical models, instructional/learning strategies, and learning technologies. The major issue of the model that embraced a new consideration into design of a learning environment lies in its emphasis on learning technologies which "placed an equal footing as the other two components to ensure that the affordances that media bring forth to a learning situation are given appropriate consideration" (p. 43).

**Table 2.1** Time Comparisons of an Online versus Face-to-Face Class for One Week (Source: Palloff & Pratt, 2007, p. 74).

| Instructor Activity | Face-to-Face Class | Online Class |
|---|---|---|
| Preparation | 2 hours per week to: Review assigned reading Review lecture materials Review and preparation of in-class activities | 2 hours per week to: Review assigned reading Prepare discussion questions and "lecture" material in the form of a paragraph or two |
| Class time | 2 ½ hours per week of assigned class time | 2 hours daily to: Read student posts Respond to student posts |
| Follow Up | 2 to 3 hours per week for: Individual contact with students Reading student assignments | 2 to 3 hours per week for: Individual contact with students via e-mail and phone Reading student assignments |
| **Totals for the week** | 6 ½ to 7 hours per week | 18 to 19 hours per week |

Authors note: Time involved with online classes is related to a number of variables such as the number of students enrolled in the class, the level of comfort with the technology on the part of both the instructor and the students, the encountering of technical difficulties, the degree to which discussion is an expected part of class activity, and the types of activities in which students are engaged.



**Instructional/Learning Strategies**
(e.g., collaboration, articulation, reflection, role-plying, exploration, problem solving

**Online Learning**

**Pedagogical Models**
(e.g., open/flexible learning, distributed learning, learning communities)

**Learning Technologies** (e.g., asynchronous & synchronous communication tools, hypermedia &multimedia tools, Web authoring tools, course management systems)

**Figure 2.1** A three-component Model for Online Learning (Dabbagh, 2004)

The model can be considered a major transformation of design considerations by taking the media element as a major component. Dabbagh explained the issue as the following (p. 44):

> ... Learning technologies bring with them their own affordances or possibilities for action. ... As learning technologies become more ubiquitous and new technologies emerge, bringing forth new affordances, pedagogical practices and social structures are transformed.

The idea of blending F2F and online environments has emerged in an effort to meet the above-mentioned challenges that resulted from the lack of one environment from the other and embrace the full advantage of the benefits of both environments. The following section introduces the blended learning concept within this context.

## 2.1.1 Turkish Higher Education Context

In Turkish higher education, the concern of the use of ICT and online learning emerged parallel to international concerns and practices. The concern was voiced by a number of policy-makers and reported in several research studies. In 1999, which is the year of legislation of the Turkish Higher Education Council (HEC) for universities to move into e-learning, Guruz, the former president of the HEC, remarked the role of technology and delivery environments in education by mentioning replaced role of virtual learning over distance education and digital libraries over book shelves and pointed out the need for distributed learning environments (cited in Özkul, 2007). A recent report by HEC (2007) on the strategies of higher education emphasized the technology use with the following statements:

> … It is obvious that an instructional approach with the use of communication technologies departing from text-based instruction approach can support student cognition and contribute to their creativeness much more. If such an approach can be achieved, use of computer based technologies can contribute to education in a great extent. … (p. 189).

The report also indicated important statements on the use of technology (taking the computer technologies as the core). It is remarked that the question of "how" has become an important issue as well as the question of "what", which further places emphasis to quality instruction. It is indicated that for quality instruction in higher education, appropriate design of instructional resources and activities has vital role.

There are a number of other Turkish universities and higher education institutions that offered online programs or courses. The first online program was Information Technologies Certificate Program at METU offered to participants in IT field and with instructors from Computer Engineering department (Yukselturk & Yildirim, 2008). The increasing numbers of programs was regarded as a marketing issue having considerable implications for universities (Demiray, Nagy, & Yilmaz, 2007). In his article on Turkish distance education, Özkul (2007) reported the status of distance learning programs of the universities as of 2007-2008, which is shown in Table 2.2.

**Table 2.2** Distance Education Programs in Turkish Universities as of 2007-2008 (Resource: Özkul, 2007, p. 714)

| University (Start Year) | Undergraduate Degree Completion | | Graduate Education (Masters Degree) | | Total Number of Programs | Total Number of Students (2007) |
|---|---|---|---|---|---|---|
| | Number of Programs | Number of Students | Number of Programs | Number of Students | | |
| Ankara University (2005) | 1 | 1.338 | - | - | 1 | 1.338 |
| Cukurova University (2003) | 1 | 515 | - | - | 1 | 515 |
| Gazi University (2006) | 2 | 1.059 | - | - | 2 | 1.059 |
| Mersin University (2002) | 4 | 1.851 | - | - | 4 | 1.851 |
| METU (2000) | - | - | 1 | 51 | 1 | 51 |
| Sakarya University (2000) | 5 | 5.455 | 2 | 550 | 7 | 6005 |
| Maltepe University (2006) | 3 | 395 | 1 | 708 | 4 | 1.103 |
| Istanbul Bilgi University (2000) | - | - | 1 | 737 | 1 | 737 |
| **TOTAL** | **16** | **10.633** | **5** | **2.046** | **21** | **12.709** |

In a study on the status of ICT in teacher education regarding ICT resources and the methods of their usage, Goktas, Yildirim and Yildirim (2008) found that there was a lack of resources with a need on technology planning, in-service trainings and related

institutional arrangements. These findings may imply the need for enhanced policies and institutional support for an improved pedagogy. Not only the physical and institutional maintenance, In their study on the factors that contribute to participant satisfaction in an online certificate program, Yukselturk and Yildirim (2008) found that as the key elements of student satisfaction and interaction, course structure and design needed to be taken into account carefully in the design of the online program.

Having experience in open and distance education programs almost for three decades (from 1982), Anadolu University has offered variety of opportunities for learners with diverse needs in its "e-transformation process" which aimed to support computer-supported learning (Aydin, Mutlu, & McIsaac, 2007, p. 118). Use of the Internet based technologies has become part of university's distance learning programs and necessary courseware and portals were developed in this context. Özkul (2007) explained this process as the effort to support their open education courses with e-learning applications.

## 2.2 Blended Learning

The idea of blending more than one technology or delivery environments with conventional (F2F) education was termed in the literature within the last two decades (e.g. Dede, 1996; Phipps & Merisotis, 1999). Considering the computer-mediated component of the blended learning systems, it can be asserted that the roots of blended learning come from distance education, and continued as web-based instruction, and online learning or e-learning. However, it is not new as an idea considering the supervised correspondence study in 1920s in the context of high school and the use of blended learning in more than hundred students in public high schools in the States by 1930s (Moore, 2006). For these date backs, blended learning is regarded as blending classroom and mediated delivery of instruction.

As a concept, blended learning has different definitions in the literature. As Driscoll (2002) pointed out, the term is used in different conceptions by different people. It is defined as a blend of media (Singh & Reed, 2001), pedagogies (Masie, 2006), learning environments (Graham, 2006; Klein et al, 2004; Moore, 2006; Young, 2002), or approaches (Littlejohn & Pegler, 2007; Rossett, Douglis, & Frazee, 2003). Regarding the media blend, Singh and Reed focused on learning objectives in "applying the "right" learning technologies" (p. 2). Regarding the pedagogy blend, Masie gave the examples of

formal lectures, classroom discussions, homework or reading examples, conversation between peers, sharing notes, etc. as components of a blended learning environment. These two approaches are criticized for being inadequate for a learning system since mix of pedagogies or methods already means any instructional environment (Graham, 2006; Klein et al, 2004). The mix of learning approaches and environments point the common theme of blended learning practice which enabled traditional F2F delivery with online or distributed deliveries.

The definition that embraces the common use of the term as a system and that also matches with the current study context is given by Graham (2006) as: "Blended learning systems combine face-to-face instruction with computer-mediated instruction" (p. 5). There are also some other terms used in the context of blended learning with similar or slightly different meanings: mixed mode (Bates & Poole, 2003; Harasim, 2000), hybrid instruction or hybrid course (Garnham & Kaleta, 2002; Hensley, 2005; Reasons, Valadares, & Slavkin, 2005; Skibba, 2006; Young, 2002), and distributed learning (Dabbagh, 2004; Dempsey & Van Eck, 2007; Lefoe, Gunn, & Hedberg, 2002; Saltzberg & Polyson, 1995; Twigg, 2001).

In training industry, the term was regarded as the "new buzzword" (Lamb, 2001). Thomson study in 1999 was one of the initial researches in this context reporting the effectiveness of blended learning (Barbian, 2002). In the context of higher education, it has become popular parallel to training contexts especially after 2000s (Bleed, 2001) with the emergence of online learning. Why blended learning has become prominent in training and higher education settings are suggested by a number of researchers. These are given in Table 2.3 in a summary format. As can be seen from the figure, improved pedagogy with increased flexibility and reduce of seat time were the mentioned most.

**Table 2.3** Summary of the Reasons for the Prominence of Blended Learning in training and Higher Education

| | Bates & Poole (2003) | Boyle, Bradley, Chalk, Jones, & Pickard (2003) | Dziuban, Hartman, Moskal (2004) | Garnham & Kaleta (2002) | Graham (2006) | Lindsay (2004) | McCray (2000) | Osguthorpe & Graham (2003) | Palloff & Pratt (2007) | Parsons & Ross (2002) | Ross & Gage (2006) | Rovai & Jordan (2004) | Singh & Reed (2001) | Wingrad (2004) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Increased student retention and achievement | | √ | √ | √ | | | √ | | | | √ | | | |
| Increased interaction and communication | | | √ | √ | √ | √ | √ | | | | | √ | | √ |
| Increased engagement with students | | √ | | √ | | √ | √ | | | | | √ | | √ |
| Student preferences and satisfaction | | | √ | | | √ | | | | | | √ | | √ |
| Availability of Web-based systems in universities | √ | | | | √ | | | | | | | | | |
| Meet diverse student learning styles | | | | | | | √ | | | | | | | |
| Improved pedagogy with increased flexibility | √ | √ | √ | √ | √ | | √ | √ | √ | | | | √ | |
| Expanded access to education | √ | | √ | | √ | | | | | √ | √ | | √ | |
| More interaction in large classes | √ | | √ | √ | | | √ | | | | | | | |
| Cost-effectiveness | √ | | √ | | | | | √ | | √ | | | √ | |
| Reduce seat time of F2F courses | √ | | √ | √ | √ | | | √ | √ | √ | | | | √ |

Although there are common purposes and benefits for the use of blended learning environments in different contexts, the way the blended learning environments can be categorized into different purposes and ways. Graham (2006), for example, categorized the primary purposes of blended learning into three: enabling blends, enhancing blends, and transforming blends. Table 2.4 presents these categories.

**Table 2.4** Categories of Blended Learning Systems. (Source: Graham, 2006, p. 13)

| Category | Description |
|---|---|
| Enabling blends | Primarily focus on addressing issues of access and convenience-for example, blends that are intended to provide flexibility to the learners or blends that attempt to provide the same opportunities or learning experience but through a different modality. |
| Enhancing blends | Allow incremental changes to the pedagogy but do not radically change the way teaching and learning occur. This can occur at both ends of the spectrum. For example, in a traditional face-to-face learning environment, additional resources and perhaps some supplementary materials may be included online. |
| Transforming blends | Blends that allow a radical transformation of the pedagogy- for example, a change from a model where learners are just receivers of information to a model where learners actively construct knowledge through dynamic interactions. These types of blends enable intellectual activity that was not practically possible without technology. |

A review of literature on blended learning shows that blended learning has commonly been used in higher education and training settings although studies can be found in other settings (K-12, adult education, etc) as well. The main focus in the studies varies: student perceptions, satisfaction, achievement, and motivation, etc.

There are studies that compared online, F2F, and blended modes in student learning and resulted in different findings. In the white paper named as Thomson job impact study, for example, three groups' on-the job productivity differences were compared for blended delivery and online delivery modes (Thomson, 2002). The researchers made use of Merrill's First Principles of Instruction framework in their instructional design considerations and made use of scenario-based exercises, real software, and mentors. The results showed that blended learning group performed 30% more accuracy than online learning group. The first group also finished real-world tasks 41% faster than the second group. The researchers concluded that "a structured blended model … *does* improve employee productivity-speed and accuracy- over non-blended learning." (p. 9).

In a comparison of F2F, online, and blended delivery of courses in terms of sense of community, Rovai and Jordan (2004) found blended learning significantly better than the

other two. With an emphasis on compatible pedagogy and good teaching abilities of course instructor for the quality of instruction, the researchers suggested the explanation of the stronger feeling of community as the fulfilling of the needs of the students that emerged in one setting in the other. Similarly, Sitzmann, Kraiger, Stewart, and Wisher (2006) found blended learning to be more effective for teaching declarative and procedural knowledge in their meta-analytic study.

Student success rates, drop-out rates and student satisfaction for fully online courses and blended courses were compared by Dziuban et al (2006). The results showed that students had equal to or higher success rates in blended delivery environment. Drop-out rates for blended courses were less than online courses but almost equal with traditional courses. Finally, the student satisfaction was high for blended courses (86%).

In another study, McCray (2000) found out that the overall efficiency was improved and financial and resources were saved with the use of blended learning. They also mentioned about the increased engagement of students to F2F interactions in blended course delivery. The researcher additionally suggested addressing different student learning styles into the design of blended learning environments.

In a recent dissertation study by Comey (2009), student perceptions were compared via their feedback on courses taught in F2F, online, and blended formats. The results showed that blended format produced a higher level of student participation and a stronger sense of being connected to instructor. The author concluded that with the integration of F2F contact to online learning, blended courses offers a beneficial learning environment.

There are also several research findings that found no significant difference in favor of blended learning. One of them is a study done by Reasons et al (2005) on the student learning outcomes in three modes of learning delivery environments (F2F, online, and hybrid). The results of the study showed that student performance differed significantly in favor of online environment. The authors concluded that course participation was not changes among these environments, but significant changes were found in favor of online learning in terms of course grades and interaction with course web-site. In their study on the creation of a hybrid learning environment, Olapiriyakul and Scher (2006) found that there was not significance difference in student performances between distance and hybrid course deliveries. In another study by Dodero, Fernandez, and Sanz (2003) on the level of

student participation and final achievements of two student groups in regard to blended and online delivery modes, the results showed that although level of participation was higher in blended learning group, no significance difference found in terms of performance.

The common use of interaction and interactivity in the learning environment (Dempsey & Van Eck, 2007) with the capabilities of the online environment offers a plus to the blended learning environments. This means an availability of interactions between student and student, student and instructor, student and content (Moore, 1989), and student and context that was offered by the opportunities of F2F and online environments. Several studies on student satisfaction and success of the blended learning environment revealed that the positive results were the attributes of the blended learning environment with the interactive capabilities of communication technologies, mainly the asynchronous nature (Garrison & Cleveland-Innes, 2005; Swan, 2001). An additional advantage of blended learning was attributed to the support of differing learning styles of learners (McCray, 2000).

Community building is another feature that blended learning offers for the participants of the learning environment. Supporting the F2F environment, online environment supports community building process (Rheingold, 1993; Garrison & Vaughan, 2008) and blending these two environments, blended learning environment support community building better (Brown, 2009).

Despite the above-mentioned benefits that blended learning offers, there are challenges in the blend of two learning environments. At the core of the challenges in designing a blended learning experience lied the mentality of regarding design not as a separate design of F2F and online environments, but approaching the integration of these environments in terms of media and methods (Garrison & Vaughan, 2008). This requires a mindset of knowing the best of the two world to merge into one.

Graham (2006) proposed six major issues for the design of blended learning systems: "(1) the role of live interaction, (2) the role of learner choice, (3) models for support and training, (4) finding balance between innovation and production, (5) cultural adaptation, and (6) dealing with the digital divide" (p. 14). Focusing more from a strategic and operational perspective, Jones (2006) remarked several issues to consider in the design

and development of a blended learning environment including the costs of the online system, time and place limit of F2F environment, administration of the availability of different choices in learning environment, quality assurance, equal access to technology, and student preferences.

Huang and Zhou (2006) mentioned three challenges in the implementation of blended learning in the context of Chinese education: designing the curriculum, designing and using online resources, and changing the strategies students use to learn. They suggested a three-stage design model for blended learning design beginning with a pre-analysis period, continuing with activity and resource design, and ending with instructional assessment. The core of the design strategy lies on the considerations of the theoretical framework or model.

Regarding the challenges of the design issues, Garrison and Kanuka (2002) asserted the front end issues would be the administrative and development challenges including related policy development, planning, resources, scheduling, and support. Other concern was stated as the leadership issues to maintain the vision to position the needs of the technological and pedagogical issues in the use of blended learning. In a study of faculty and student perceptions for blended learning at the University of Central Florida, Futch (2005) found that students viewed blended learning as a way to become active participants although the satisfaction showed a decrease for younger students. Other than these, although blended learning promises to overcome the time barrier (Oblinger, Barone, & Hawkins, 2001), it creates a challenge for designers in the design of the learning environment by placing pressure to do it quick (Dempsey & Van Eck, 2007).

In the recent years, there are also increasing use of blended learning environments in Turkish higher education, especially in undergraduate level. Studies focused on student perceptions on different dimensions. In their study on student perceptions, Delialioglu and Yildirim (2008) examined student perceptions on the blended delivery of an undergraduate course based on effective dimensions of learning. The findings showed that students perceived the pedagogy, metacognitive support, authentic learning activities, collaboration, type and source of motivation, individualized learning, and access to the Internet to be the important issues in their learning in the blended learning environment.

Another study on student perceptions were done by Akkoyunlu and Yilmaz Soylu (2008) based on different learning styles. Study results indicated that students perceived the blended learning environment an opportunity to enhance their learning opportunities. Ateş, Turalı and Güneyce (2008) also collected qualitative data on student perceptions to an undergraduate blended course. Although students were undecided on the use of blended courses for all courses, they mostly had positive views about blended learning application in their particular course.

## 2.3 Design of Learning Environments

Design of a learning environment is related to concepts of instructional design and development in the scope of this study since the focus of the study comprised course design, development and implementation processes. With this in mind, related literature on design of learning environments are highlighted with an emphasis on the issues of instructional design, development, and implementation.

As a professional event of educators, instructional design (ID) is defined as "the process of deciding what methods of instruction are best for bringing about desired changes in student knowledge and skills for a specific course content and specific student population" (Reigeluth, 1983, p. 7). It can be grasped that the major emphasis of the ID process at this definition is on instructional methods. Reigeluth also described the distinction between instructional design, instructional development, and instructional implementation with the following explanations (p. 9):

> … instructional design is concerned with optimizing the process of *instructing*. Instructional development is concerned with optimizing the process of developing [creating] instruction. Instructional implementation is concerned with optimizing the process of implementing [putting some developed instruction into use] the instruction. Instructional management is concerned with optimizing the process of managing [maintenance] instruction. And instructional evaluation is concerned with optimizing the process of evaluating [assessing the effectiveness and efficiency] the instruction.

There are two critical issues that can be derived of these statements: The first one is the major emphasis on the *optimization of the processes* in instruction. With this emphasis and the afore-mentioned emphasis, *instructional methods*, it can be argued that making use of the best methods in the best way lies at the heart of ID. That is to state that ID helps educators identify the best ways to supply the needs of a learning environment for quality

instruction (Morrison, & Ross, Kemp, 2004). The second issue is a more general picture of the terms that were referred to be separate components of instruction: design, development, implementation, management, and evaluation. Reigeluth (1983) expanded the relationship of these terms and argued that just as ID prescribed methods, procedures and remedies for instructional development, implementation, management, and evaluation; instructional development and management provided cost-effectiveness information and instructional implementation provides information on constraints and cost effectiveness for ID.

In the literature, ID was also used as a term that was used for implying a process including all these concepts (design, development, implementation, management, and evaluation) with a systematic approach (Banathy, 1987; Berger & Kam, 1996; Gustafson & Branch, 1997), which is the reference of using the term Instructional Systems Development (ISD) as a general phrase (Dick et al, 2001). The common point in ISD processes and models in the literature (e.g., Dick and Carey model, Morrison, Kemp, and Ross' model; Smith and Ragan's model) is denoted as the generic ADDIE that combines the core components of analysis, design, development, implementation, and evaluation (Bagdonis & Salisbury, 1994; Dick et al., 2001; Gustafson & Branch, 2007; Morrison, Ross, & Kemp, 2004; Seels & Glasgow, 1998; Smith & Ragan, 2005). This approach is commonplace in the design of many learning environments with a systematic approach that involved iterations and revisions throughout all processes with forwards and backwards (Ross et al, 2008). One issue that needs to be highlighted is that during the processes of ID, a set of principles and theories help IDers in their decisions for the identification of instructional methods to be used (Reigeluth, 1983; Richey, 1986).

Richey (2005) identified two types of ID models: conceptual and procedural. While conceptual model "identifies variables that impact the design process and shows their interrelationships", the procedural model "represents the recommended steps to follow in a design process" (p. 172). This classification relates to the use of models in ID practice. The existence of these conceptual and procedural approaches reveals another nature of ID, which is being not only a process but also a product which was characterized as the educational setting it adheres (Dijkstra, 1997).

The recent developments in the technology and media, especially the emergence of the Internet, have led IDers develop and work on specific ID models, principles, or theories

for using them effectively in education (Reiser, 2001). Although the major emphasis for ID processes was given on methods, principles and theories, in the literature can be found studies proposing specific ID models for technology based environments. As Vrasidas and McIsaac (2000) pointed out in their paper on online learning, the prescriptions are not specific to the delivery format. The point that is common to all other ID studies for technology-based learning environments is the design considerations made for the specifics of the learning environment.

### 2.3.1 Instructional Design in Blended Learning Environments

Blended learning designs are not the simple integration of online environment to F2F courses, but beyond, the use of best of the environments in the context of a course which requires a careful instructional design approach (Dodero et al, 2003; Kerres & De Witt, 2003; Zenger & Uehlein, 2001). For this reason, blended learning design is regarded as "a fundamental reconceptualization and reorganization of the teaching and learning" (Garrison & Kanuka, 2002, p. 97), "a whole new philosophy of teaching" (Ward & Draude, 2009, p. 4), and "a fundamental redesign of the instructional model" (Dziuban et al, 2004, p. 3).

It is of important concern to distinguish blended learning design from technology enhanced or online supported courses (Garrison & Kanuka, 2002). This requires a mindset of developing a learning environment in which technology do not replicate the F2F environment but add value to the overall learning context (Davies, Ramsay, Lindfield, & Couperthwaite, 2005). In such a design process, Dempsey and Van Eck (2007) suggested the use of "systemic organization of instructional materials and effective instructional strategies and technics- two principle strengths of instructional design" (p. 290). Taking this notion one step further, it can be argued that blended learning environments require a well-grounded pedagogy with the use of effective strategies for the common balance of learning environments.

Research on blended learning revealed that there is no best way for how to blend (Hoffman, 2006; Garrison & Vaughan, 2008). The proportions all change with the needs of the training, course, or context of the environment. Allen, Seaman and Garrett (2007), for example, regarded these proportions of the online delivery in their report as the following: traditional course (0% online delivery), web facilitated course (1-29% online

delivery), blended course (30-79% online delivery), and online delivery (80+% online delivery). Unlike Brown (2001) who averred the optimum use of proportions to be 10% (online)-90% (F2F) or 10% (F2F)-90% (online), Olapiriyakul and Scher (2006) indicated that the proportions in New Jersey Institute of Technology was standardized to be in a 50-50 ratio. These rates are summarized in Table 2.5.

**Table 2.5** Suggested Rates of Online and F2F Proportions in a Blended Learning Environment

| Source | Online Portion (%) | F2F Portion (%) |
|---|---|---|
| Allen, Seaman & Garrett (2007) | 30-79 | 70-21 |
| Brown (2001) | 10-90 | 90-10 |
| Olapiriyakul & Scher (2006) | 50 | 50 |

In effective course design, the primary focus needs to be on pedagogy rather than on technology (Cagiltay, 2001; Laurillard, 1993). In the implementation of the pedagogy, it is also important to count for instructor experiences and high interpersonal skills (Derntl, Motschnig-Pitrik, 2004). Another key issue is the consideration on the selection of the best mode (synchronous or asynchronous modes of online of F2F) in the learning activities (Ross & Gage, 2006). Designing a blended course also needs to incorporate the student learning styles into course structure or consider different characteristics of learners (Ausburn, 2004; Olapiriyakul & Scher, 2006).

Design considerations in the process of course design differ in every single design, since design approaches vary for different instructors or IDers. However, there needs to be several prescriptions for these designers or instructors to follow in their design process. Bates and Poole (2003), for example, suggested addressing the following concerns in the production plan (p. 185):

- What needs to be produced or developed and in what medium or format?

- When will the professor have to have her materials ready, and in what format?
- Who owns the material?
- When will materials be produced by the technical production areas?
- When will each part of the course be ready for delivery?
- What will be the direct costs of production and how will this be paid for?

These questions are critical issues in the development and implementation of a course design addressing the strategies and methods to be used. Moving more on social and cognitive aspects of the design considerations, Garrison and Vaughan (2008) proposed general principles as a guideline in the design of a blended learning environment as the following (pp. 33-46):

- plan to establish a climate that will encourage open communication and create trust,
- plan for critical reflection, discourse, and tasks that will support systematic inquiry,
- sustain community by shifting to purposeful, collaborative communication,
- encourage and support the progression of inquiry,
- manage collaborative relationships to support students in assuming increasing responsibility for their learning,
- ensure that inquiry moves to resolution and that metacognitive awareness is developed, and
- ensure assessment is congruent with intended learning outcomes.

All these principles lay foundations for creating a community of inquiry that emerges with the merge of real and virtual opportunities in a blended learning experience. For this reason, the design of blended learning needs to focus on "the interacting influences the additional options and choice of fusing face-to-face and online communities of inquiry." (p. 103).

In the design of training programs, Hofmann (2006) described her course design strategy to be the basic instructional systems design (ISD) process by employing Dick and Carey

model. She argued that the main tenet specific to blended programs is the seventh principle of the model: "determination of appropriate delivery media" (p. 32). In this determination, she was considerate about the suitability of subject to online environment and objectives of the training.

In the design considerations of a hybrid course, Olapiriyakul and Scher (2006) argued that there was no difference in the F2F content design while it needed adjustments in the online mode. For the design of online environment, they used a framework to balance the technology and pedagogy, which is illustrated in Figure 2.2.
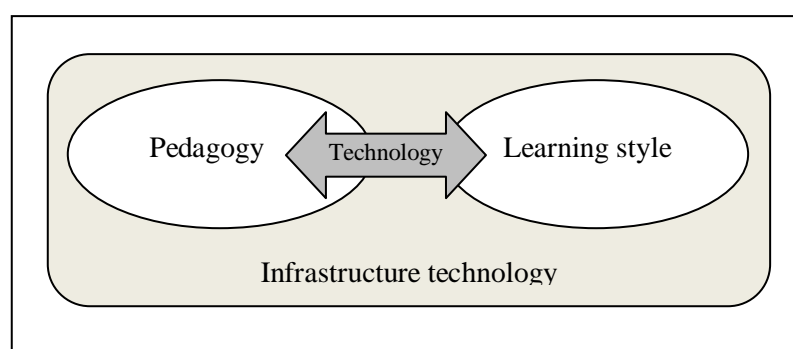


**Figure 2.2** Framework of Hybrid Learning in Design Process (Olapiriyakul & Scher, 2006)

In the study with 67 adults, Ausburn (2004) identified the preferred instructional features of the course design with a comparison of participant rankings of course design elements. The results showed that preferences changed with different gender, learning strategies, and previous experience with technology and self-directed study, which signified the importance of meeting multiple learning needs in course design. The author suggested the use of adult learning principles in the design that valued personalization, self-direction, variety, and learning community.

## 2.4 First Principles of Instruction

This section introduces Merrill's first principles of instruction that was used as a framework in the design of the blended learning environment of the study. It is believed that a brief introduction of the principles would provide readers with more clear understanding of the study context.

Merrill (2002) identified the first principles of instruction in an effort to develop "prescriptive principles that are common to the various theories" (p. 43) based on his synthesis over numerous instructional design models and theories and with his more than forty years' experience in the field. He propounded that these principles were known over last two centuries (Merrill, Barclay, & van Schaak, 2008). The theories he investigated included Star Legacy by the Vanderbilt Learning Technology Center (Schwartz, Lin, Brophy, & Bransford, 1999), 4-Mat cycle of learning by McCarthy (1996), instructional episodes by Andre (1997), multiple approaches to understanding by Gardner (1999), collaborative problem solving by Nelson (1999), constructivist learning environments by Jonassen (1999), and learning by doing by Schank (Schank, Berman, & Macperson, 1999). His framework included the following principles as the instructional design prescriptions (Merrill, 2002, pp. 44-45):

- Learning is promoted when learners are engaged in solving real-world problems.
- Learning is promoted when existing knowledge is activated as a foundation for new knowledge.
- Learning is promoted when new knowledge is demonstrated to the learner.
- Learning is promoted when new knowledge is applied by the learner
- Learning is promoted when new knowledge is integrated into the learner's world.

Figure 2.2 shows the four-phase cycle of instruction demonstrating these principles. Merrill (2007) notified that all these four phases need to be integrated to instructional design environment for effective instruction. Starting from the activation of the prior knowledge to the integration of new knowledge, all phases are interrelated to each other.
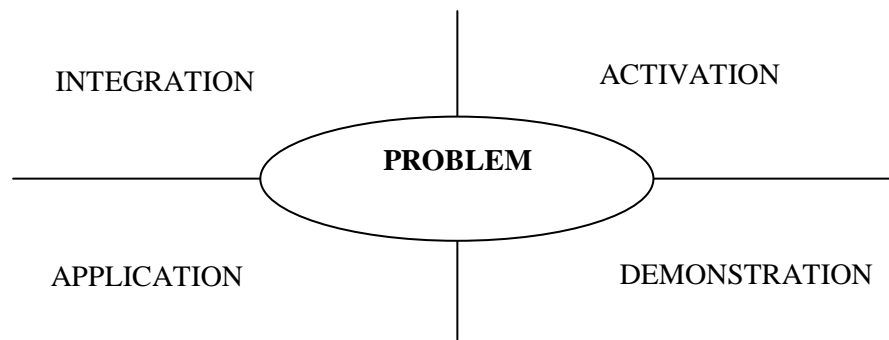
**Figure 2.3** Phases of Effective Instruction (Merrill, 2002)

Each of the principles addresses specific activities or phases on the instructional problem given. In the following paragraphs, these phases will be described in detail in accordance with Merrill's (2002, 2007) descriptions:

***Principle 1: Problem-Based:*** The central activity in effective instruction is problem. Problem lies at the heart of instructional considerations since designing instructional systems requires solution to a problem (Briggs & Wager, 1981). Merrill (2002) described problem as a variety of activities where each activity is a complete whole task that is represented as a real-life event that can be came across after instruction. In this principle, it is important to show learners the tasks and problems that they will complete or be engaged. Learning is facilitated when the problems are introduced in problem, task, operation, and action levels. Related to previous literature, Merrill (2007) posed the several questions and prescriptive concerns to these questions as the following (p. 65 [*italics* added for direct quotation]):

- *Does the instruction involve authentic real-world problems or tasks?* Use of job contexts and job-specific problem-solving processes are suggested.
- *In place of a formal objective, does the instruction show the learners the whole task they will be able to do or the whole problem they will be able to solve as a result of completing the instruction?* Providing of procedural examples to solve problems, use of task or problem oriented objectives, and illustrating tasks to inform learners of the goals are suggested. Additionally it was suggested that instructional goals would not be very specific.

- *Does the instruction teach the component tasks of the problem or task and then help the learner use these components in solving the whole problem or doing the whole task?* Parts of a process and letting students practice the new material learnt were suggested.

- *Does the instruction involve a progression of problems, not just a single application?* Use of job-realistic and worked examples is suggested.

*Principle 2: Activation:* The first activity in the context of a problem is the activation of the prior knowledge. This phase emphasizes the need to promote learning by helping students recall, relate, describe, or apply previous knowledge and offering relevant experience to use or organize their previous knowledge on new knowledge. For limited prior knowledge of learners, Merrill suggests to provide relevant experiences that would serve as a foundation. Corollary to related research works, Merrill identified the following questions that would help identify the instructional prescriptions for this phase (pp. 65-66):

- *Does the instruction direct learners to recall, relate, describe, or apply prior knowledge from relevant past experience that can be used as a foundation for the new knowledge?* For this question, use of cues, questions, and review of relevant prerequisite skills and knowledge were suggested in line with the related literature.

- *Does the instruction help learners see its relevance and to have confidence in their ability to acquire the knowledge and skill to be taught?* For this question, communication of course goals to the students was suggested in line with literature.

- *Does the instruction provide or encourage the recall of a structure that can be used to organize the new knowledge?* Regarding this question, related literature addressed the use of graphic and advance organizers, conceptual models, or checklists.

*Principle 3: Demonstration:* This principle has a major focus on demonstration of the tasks or skills to be taught. This involves showing "portrayals [which are] representations of specific cases that are concrete and that illustrate how the information applies to a

single situation" (Merrill, 2007, p. 63) as a support to information. Related questions and corollary principles and prescriptions are as the following (pp. 66-67):

- *Does the instruction demonstrate (show examples of) what is to be learned, rather than merely telling information about what is to be learned?* The question addressed the replacement of practice problems with the worked ones and presentation of worked-our examples.

- *Are the demonstrations (examples) consistent with the content being taught?* Regarding the consistency of content, use of examples and non-examples, practice exercises, demonstration of how-to procedures and visualizations for processes are suggested in the related literature.

- *Are some of the following learner guidance techniques employed?* For learner guidance issue, Merrill gave space for these techniques derived from literature: directing learner attention to relevant information, using narrated animations, guiding students in the identification of similarities and differences, using signaling devices, using multiple and visual representations, simultaneously using graphics and texts, helping learners relate prior knowledge with the new knowledge, and providing concise instructions for new knowledge.

- *Are the instructional media relevant to the content and used to enhance learning?* Regarding the media used, these techniques were suggested in the related literature: speech use of words instead of text, use of animation and narration, exclusion of extraneous sounds, pictures, graphics, and words.

*Principle 4: Application:* This principle tells that learning can be promoted with the application of the knowledge and skills in the learning process with appropriate feedback and guidance.

- *Do learners have an opportunity to practice and apply their newly acquired knowledge or skill?* Letting students practice and checking them for their understanding were suggested for this concern.

- *Are the application (practice) and assessment (tests) consistent with the stated or implied objectives?* In order to ensure consistency, the match of practice between factual information and recall of information, information parts and

location and description of information, concept and identification of new examples, procedure and application of procedure, and process and prediction of a consequence of a process need to be taken into consideration.

- *Is the practice followed by corrective feedback and an indication of progress, not just by right-wrong feedback?* Corrective feedback specific to the criterion and systematic is suggested so that learners can better transfer their learning to real life.

- *Does the application or practice enable learners to access context sensitive help or provide coaching when they are having difficulty in solving the problem or doing the task? Is coaching gradually diminished with each subsequent task until learners are performing on their own?* Use of onscreen coaches; providing of procedural prompts, models of appropriate responses, think aloud notes, difficulty regulations and discussions, and cue cards; and increasing of learner responsibilities as well as cognitively supporting learners were suggested.

- *Does the instruction require learners to use their new knowledge or skill to solve a varied sequence of problems or complete a varied sequence of tasks?* Use of a variety of structured tasks was suggested.

*Principle 5: Integration:* This final principle tells that demonstrating the applied skill, knowledge or attitude, and reflecting, discussing, and defending this new knowledge helps learner to integrate and combine what was gained.

- *Does the instruction provide techniques that encourage learners to integrate (transfer) the new knowledge or skill into their everyday life?*
- *Does the instruction provide an opportunity for learners to publicly demonstrate their knowledge or skill?*
- *Does the instruction provide an opportunity for learners to reflect on, discuss, and defend their new knowledge or skill?*
- *Does the instruction provide an opportunity for learners to create, invent, or explore new and personal ways to use their new knowledge or skill?*

Merrill (2002) addressed the main features of the first principles of instruction as applied in educational settings in three. The first one identifies the encouragement and support of

learning to be directly proportional to implementation of the principles. The second feature tells that the principles could be used in any delivery system or instructional program or practice. The final feature is the differentiation of principles to be design oriented and prescriptive rather than learning oriented and descriptive. It is also strongly emphasized that the design principles could be implemented in any program or practice including any learning environment.

# CHAPTER 3

# METHODOLOGY

This chapter introduces the research methodology that guided this study. Initially, the rationale of the methods chosen for the study, the procedure followed, and the context of the course are introduced. After that, the participants, instruments and the data analysis together with validity and reliability issues are explained.

## 3.1 Design of the Study

The purpose of this study is to examine and describe student and instructor experiences with and their perceptions of course design regarding the use of blended learning environment. More specifically, this study strived to reveal and understand the enablers and barriers of course design with the use of blended learning from instructor and students' perspectives and hence identify the important elements of designing blended learning environments. The research questions that were investigated are listed as follows:

1. What are the instructor's experiences while designing a course in a blended learning environment?
   a. What are the considerations during analysis?
   b. What are the considerations during design and development?
   c. What are the enablers of the use of blended learning environment during implementation?
   d. What are the barriers of the use of blended learning environment during implementation?
2. What are the students' experiences of the enablers and barriers to learning in a blended learning environment?

a. What are the students' perceptions of the enablers to learning in blended learning environment?

b. What are the students' perceptions of the barriers to learning in blended learning environment?

c. What are the students' perceptions of the necessary conditions for learning in blended learning environments?

3. What are the issues of course design critical to the use of blended learning environment?

To answer these questions, a design based research (DBR) approach was carried out by collecting data in an undergraduate course offered to sophomores. The primary approach for the design of this research was qualitative with the phenomenological tradition. Hence, this DBR research is a qualitative study that draws from the general framework of phenomenology. Within the framework of phenomenology, the researcher approached the study using the lens of heuristic inquiry. As in Figure 3.1, various approaches were used in the study and are described in the following section.

### 3.1.1 The General Strategy on the Selection of Methods

The selection of the appropriate research design was guidelines that Patton (2002) and Yildirim and Simsek (2000) suggested. It is believed that a design based research guided by phenomenology was an appropriate research design considering the following points:

(1)     *Focus of the study:* The study mainly focused on designing effective blended learning environments which was intertwined with the main focus of DBR: a focus on design and investigation of critical design elements (Collins, Joseph, & Bielaczyc, 2004; McKenney, Nieveen, & van den Akker, 2006). Use of DBR also was suitable given that it helps researchers "investigate the possibilities for educational improvement by bringing about new forms of learning in order to study them" (Cobb, Confrey, diSessa, Lehrer, & Schauble, 2003, p. 10). Additionally, since the main aim of the study was to examine and describe student and instructor experiences and their perceptions in the blended course, phenomenology was helpful in the "re-creation of the lived experience, that is, full and complete depictions of the experience from the frame of reference of the experiencing person" (Moustakas, 2000, p. 264).
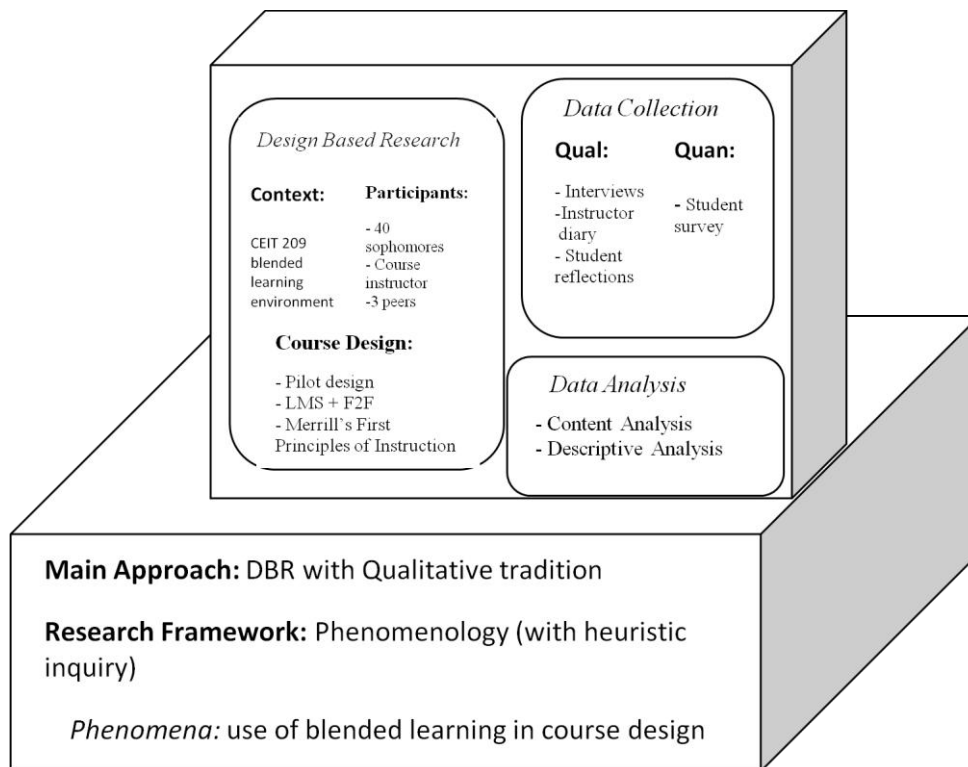
**Figure 3.1** Main Approaches in the Research Design

(2)    *The nature of research questions:* The phenomenological approach was suitable given that the research questions were focused on the participants' experiences and perceptions of the enablers and barriers to the use of blended learning environment that can be derived from the meanings participants place to their experiences. Furthermore, the illumination of the considerations during the design processes with the related iterations complements a DBR approach in the research framework (Edelson, 2006).

(3)    *Type of data related to research questions:* The description of the enablers and barriers during the teaching and learning processes can be highlighted through interpreting multiple evidences gathered from the participants' experiences in a blended learning environment. That is, the data related to the descriptive and exploratory research questions were appropriate to the nature of both qualitative and quantitative data. The strength of qualitative techniques in this study lay in its rich and detailed nature in terms of exploring the meaning people create sense from their experiences (Bogdan & Biklen,

1998; Strauss & Corbin, 1998). Quantitative data collection was also incorporated into the research design so that it can provide more data on student experiences and perceptions and thus, can help triangulate the qualitative data.

(4)    *Data to be gathered:* This study included in depth interviews, instructor diaries, student questionnaires, students' weekly reflections, peers' observations, and course related documents which allowed the researcher to have a flexible research process (Johnson & Christensen, 2004; Walliman, 2006). It also allowed information on the perceptions of participants regarding the barriers and enablers of course design with the use of a blended learning environment and hence allowed the researcher to determine the key influential factors on designing a blended course through a DBR approach.

Details for the use of each approach are explained in the following sections.

### 3.1.2 The Use of Design Based Research

Design based research is defined as "the study of learning in context through the systematic design and study of instructional strategies and tools" (Design-Based Research Collective, 2003, p. 5). The roots of DBR come from the earlier approaches, referred to as "design experiments" by Alan Collins (1992) and Ann Brown (1992) and as "developmental research" by Freudenthal, Janssen, and Sweers (cited in Gravemeijer & Cobb, 2006, p. 18). The goal of these efforts was to study complex innovative learning environments and develop an understanding of the relevance of these environments in naturalistic settings rather than laboratories (Barab & Squire, 2004; Brown, 1992; Gravemeijer & Cobb, 2006; Sandoval & Bell, 2004).

There are other terms and approaches for studies in the field focusing on design and development of instructional models, tools, or products. These include design and development research (Seel & Klein, 2007), development research (Van den Akker, 1999), formative research (Newman, 1990), and developmental research (Richey, Klein, & Nelson, 2003; Richey & Nelson, 1996; Seels & Richey, 1994). According to Reeves (2000), these efforts were made in response to the call by Stokes in 1997 for "use-inspired basic research." (p. 3). In the current study, the term DBR is used to define the research process.

DBR begins within a domain where it is used as a theoretical guide and focuses mainly on innovations (Barab, Arici, & Jackson, 2005; Cobb et al, 2003; Kelly, 2006). DBR is typically characterized as a process of "continuous cycles of design, development, implementation, and redesign" (Jonassen, Cernusca, & Ionas, 2007, p. 48). The major characteristics of DBR involve are listed as the following (van den Akker, Gravemeijer, McKenney, & Nieveen, 2006, p. 5):

- Interventionist: the research aims at designing an intervention in the real world;
- Iterative: the research incorporates a cyclic approach of design, evaluation, and revision;
- Process oriented: a black box model of input-output measurement is avoided, the focus is on understanding and improving interventions;
- Utility oriented: the merit of a design is measured, in part, by its practicality for users in real contexts; and
- Theory oriented: the design is (at least partly) based upon theoretical propositions, and field testing of the design contributes to theory building.

Barab and Squire (2004) describe the reasons for using DBR as "producing new theories, artifacts, and practices that account for and potentially impact learning and teaching in naturalistic settings" (p. 2). Similarly, Collins et al. (2004) listed the key reasons for conducting design research as the following (p. 16):

- The need to address theoretical questions about the nature of learning in context,
- The need for approaches to the study of learning phenomena in the real world rather than the laboratory,
- The need to go beyond narrow measures of learning,
- The need to derive research findings from formative evaluation.

To further illuminate the framework of design research, Figure 3.2, created by Reeves (2006), is given below demonstrating the approaches to both design and predictive research in the field. As seen from the figure, design research begins with the analysis of practical problems, which is followed by the development of solutions with iterative

cycles of testing and refinement. The iterations supply the improvements in theory and also help in revisions in the interventions (Burkhardt & Schoenfeld, 2006). The final product is design principles or enhanced solution implementation instead of specification of new hypotheses. Similarly, the purpose of this research was to improve practice in the design of blended learning environments.

Using higher education context as the main framework, Reeves, Herrington, and Oliver (2005) proposed the following common characteristics of DBR (p. 103):

- A focus on broad-based, complex problems critical to higher education,
- The integration of known and hypothetical design principles with technological affordances to render plausible solutions to these complex problems,
- Rigorous and reflective inquiry to test and refine innovative learning environments as well as to reveal new design principles,
- Long-term engagement involving continual refinement of protocols and questions,
- Intensive collaboration among researchers and practitioners, and
- A commitment to theory construction and explanation while solving real-world problems.

The literature reports the use of a design approach for different purposes including design and development of a model, product, or instructional environments (Jonassen et al, 2007; McKenney et al, 2006; Tabak, 2004). In their study on a game-based learning environment, Barab, Zuiker, Warren, Hickey, Ingram-Goble, and Kwon (2007) used DBR "to illustrate and warrant the creation of a situationally embodied curriculum that supports the learning of specific disciplinary formalisms" (p. 1). In the study, the researchers applied gaming design principles to the curriculum and tried to improve the theoretical underpinnings of their investigation with the use of DBR approach.

**Predictive Research**

| Hypotheses Based upon observations and/or existing theories | Experiments designed to test hypotheses | Theory refinement based on test results | Application of theory by practitioners |

Specification of New Hypotheses

**Design Research**

| Analysis of practial problems by researchers and practitioners in collaboration | Development of solutions informed by exising design principles and technological innovations | Iterative cycles of testing and refinement of solutions in practice | Reflection to produce "design principles" and enhance solution implementation |

Refinement of Problems, Solutions, Methods, and Design Principles

**Figure 3.2** Predictive and Design Research Approaches in the field (source: Reeves, 2006)

Another example is the development of a Web-based learning environment by the Learning Sciences Institute at the University of Missouri to engage students in the hermeneutic analysis of biblical texts (Jonassen et al., 2007). The researchers began the study with an analysis of conditions, use of a theoretical orientation (cognitive flexibility theory) and moved by development of the Web-based environment and engaging learners in the learning environment.

Given that the major goal of DBR research is to investigate and find ways to improve the design in practice (Collins et al, 2004), this study can be categorized as a DBR research

with the main purpose of identifying the critical elements of designing and developing a blended learning environment. Additionally, it is believed that use of a DBR approach was an appropriate method in studying the design issues of a blended learning environment and the important elements of the process from the perspectives of the researcher and students (insiders) and peers (outsiders). Moving from the point that blended learning design is very much context-dependent (Harris, Connolly, & Feeney, 2009), and allow for investigation focused more on the products and processes of design (Wilson, 2004), use of DBR allowed the researcher to investigate the design process throughout all stages in context and hence acquire rich data from participants' natural setting.

To sum up, the nature of the current study matches with DBR in two ways. First, the study aims to investigate the processes of analysis, design, development, and implementation of a blended learning environment. Second, the study aims to fulfill the gap in our understanding of the design of blended learning environments by utilizing a descriptive and evaluative framework.

As aforementioned, iterations are critical parts of DBR (Cobb et al, 2003; Reeves et al., 2006). Similarly, this study had an iterative nature in its process, which can be diagrammed as an iterative cycle. The iterative design cycle, adapted from Gay and Hembrooke (2004), is provided below to describe the research design process (Figure 3.3). As can be inferred from the figure, the components of the cycle cover four phases: analysis, design and development, implementation, and evaluation. These phases cover the course design processes. Steps during the whole process are labeled into eight core components. The first and fifth components are placed in the "analysis" quarter since these steps involve the identification of needs and requirements of the traditional delivery and that of the blended delivery of the pilot semester. The second and sixth components are related to the "design" of the system, which lies at the core of this study in terms of identifying the considerations and challenges. The "implementation" part covers the third and seventh components of the cycle in terms of pilot process and actual implementation. Finally, the evaluation quarter covers the fourth and eighth components in which the designs were evaluated for the pilot process and actual implementation process. It can be noted that the iterative nature warranted a nonlinear process for the research approach. The components of the cycle as adapted in the research are explained in detail in the next section on research procedure (3.2) to outline the processes with timeline and procedure.

Analysis

Design & Development

6. Revision of Course Design

5. Refinement Needs

1. Needs analysis

2. Pilot D & D

4. Evaluation of pilot design

3. Pilot implementation

8. Final evaluation

7. Actual Implementation of the course

Evaluation

Implementation
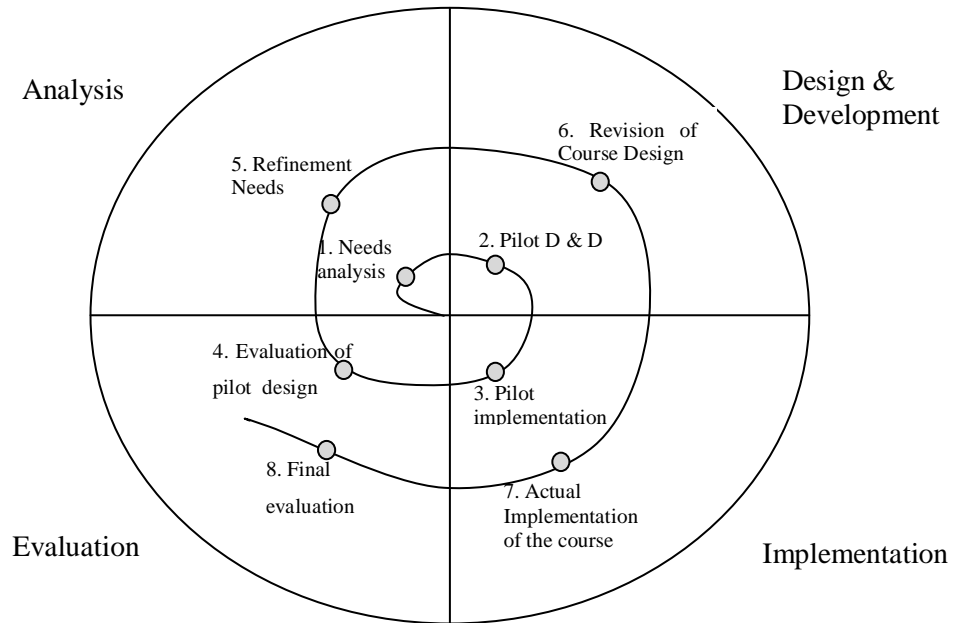
**Figure 3.3** Procedural Path of Research Design (adapted from Gay & Hembrooke, 2004).

### 3.1.3 The Use of Qualitative Approach

Qualitative research provides researchers with an in-depth exploration of a phenomenon in its natural environment (Merriam, 1998). Using a qualitative approach enabled the researcher to describe the phenomenon, focus on specific situations and people, study the phenomenon in an open-ended way, and focus on events as naturally occurring (Johnson & Christensen, 2004; Maxwell, 1996; Miles & Huberman, 1994; Patton, 2002). The process of this qualitative study can be characterized as a "dialogue or interplay between researchers and their subjects" since the main aim of the researcher was to reveal students' and instructor's experiences and perspectives (Bogdan & Biklen, 1998, p. 7).

Since the main aim of the study is to examine and describe student and instructor experiences and their perceptions in a blended course, qualitative tradition of research helps for "understanding the *meaning*, for participants in the study, of the events, situations, and actions they are involved with and of the accounts that they give of their lives and experiences" (Maxwell, 1996, p. 17). In addition to its descriptive nature, qualitative research has exploratory and explanatory purposes (Marshall & Rossman,

2006) in that by revealing the enablers and barriers in design of and learning in a blended learning environment, the study aims to explain the patterns of the phenomena, which is identification of the issues in course design critical to the use of blended learning environments.

It is believed that understanding the experiences of students and instructor in designing and learning in a blended learning environment is very much related to the meaning these people give to their "lived experiences" (Van Manen, 1990). The sub research questions seeking an understanding of the enablers and barriers of the designing, developing, implementing and learning processes, hence, can be highlighted through interpreting multiple evidences gathered from the participants' experiences in a blended learning environment. The strength of qualitative techniques lies in its rich and detailed nature in terms of exploring the meaning people make of their experiences (Bogdan & Biklen, 1998; Strauss & Corbin, 1998).

Although the primary approach was a qualitative design, quantitative data collection was also incorporated into the research design so that it can provide more data on the student experiences and perceptions and that can help triangulate the qualitative data. It was also aimed to help generalize some qualitative findings during interpretation process.

### 3.1.4 The Use of Phenomenology

As the general framework of the study, the phenomenological tradition of qualitative inquiry was used in the form of heuristic inquiry to elicit the meanings of the experiences of the participants. The phenomena investigated in this study can be labeled as the use of blended learning environment in course design. The researcher aimed to design the study so that the essences of the experiences of the instructor in designing and delivering a blended course and that of the students in participating and learning in a blended course can be revealed. In doing so, the researcher collected descriptive data throughout a course semester period (fall 2006). As Jonassen (2000) suggested, "understanding phenomena is inextricably interrelated with our experiences of them" (p. 93) and taking this into account, the experiences of the students and the instructor were investigated in depth.

Phenomenological inquiry is defined as the "description of the experiential meanings as we live them" in order to "describe and interpret these meanings to a certain degree of depth and richness" (van Manen, 1990, p. 11). That is, it is a form of qualitative inquiry

that seeks the essences of lived experience (Merriam, 1998; Patton, 2002). The word "essence" here conveys the "commonality in human experience … [which is] an essential characteristic of an experience" (Johnson & Christensen, 2004, p. 365). The essences of the phenomenon are deeply investigated in order to understand "what something is – really- like" and to look at the nature of the phenomenon in a "holistic and analytical, evocative and precise, unique and universal, powerful and sensitive" manner (van Manen, 1990, p. 42). Therefore, studying the lived experience helps the researchers elicit the meanings that people give to their experiences and connect them to their social world (Miles & Huberman, 1994).

Heuristic inquiry is a form of phenomenological inquiry that allows the researcher to include his/her own personal experiences and insights (Patton, 2002). The heuristic approach allowed the researcher of this study to reflect on her experiences of the phenomenon as a participant as well as a researcher. This argument brings the concept of reflexivity to the forefront. Van Manen (1990) noted that reflexivity of the experience is important since phenomenology aims to:

> transform lived experience into a textual expression of its essence- in such a way that the effect of the text is at once a reflexive re-living and a reflective appropriation of something meaningful: a notion by which a reader is powerfully animated in his or her own lived experience. (p. 36)

The term *heuristic* is a Greek word meaning to discover or find (Moustakas, 1990). The major focus of heuristic inquiry is on the essence of the experience with the phenomenon under study which is gained through researcher's intense engagement with the phenomenon (Douglass & Moustakas, 1985; Patton, 2002). Personal insights and reflections of the researcher are, therefore, fundamental in this type of research. In this research, engaging in a heuristic design allowed the researcher to identify the personal insights gained through immersing herself in the context of the study. Co-researchers can also be involved in heuristic inquiry which can help develop connectedness and mutual effort to illuminate the meaning and the essence of the experience (Patton, 2002). This study involved participants who acted as observers of the course context and helped the researcher gain more reflections on the phenomenon.

It is anticipated that using the heuristic inquiry approach allowed the researcher to focus on the events and aspects of experiences and perceptions rather than on outcomes, which provided her with an authentic depiction of the use of blended learning environments in

course design. Throughout the research process as described by Moustakas, the researcher got involved in the environment as an insider (Denzin & Lincoln, 2005), focused on the research concern through diaries, and analyzed, interpreted, and synthesized her perspectives and experiences together with that of the students. It is believed that the subjective nature of the heuristic inquiry has enabled the researcher to uncover the meaning of the design experience as humanly lived.

The heuristic inquiry approach is helpful given that the research questions focus on the experiences and enablers and barriers of the use of blended learning environments that can be derived from the meanings participants place on their experiences. Another aim of using a heuristic approach was to include the researcher's experiences as a course instructor and investigate the phenomena of the use of blended learning environment in course design from different perspectives involving students and observers. As Douglas and Moustakas (1985) asserted, heuristic researchers embrace the "depictions of essential meanings and portrayal of the intrigue and personal significance that imbue the search to know" (p. 43).

## 3.2 Procedure of the Study

The procedure of the research covers eight main phases. These phases do not follow a linear path, but has an iterative nature, which means new components do not begin after one finishes, but have overlapping periods: when the researcher needed, she went forward or back circled back to a previous phase. It is necessary to note here that in order to increase the credibility of the research, expert reviews, and peer reviews were gathered before and throughout all data collection process. A doctoral committee chosen among the instructors in CEIT department, Department of Educational Sciences (EDS), and Department of Secondary School Mathematics Education (SSME) guided the processes in preparing data sources, collecting data, and during the periods of design, development, and implementation of the course.

These phases are the components of the iterative design cycle (Figure 3.3) that this study adapted. The things done in each component are explained as follows:

1. *Needs analysis:* During fall 2004 and spring 2005 semesters, the course was investigated in depth to understand the activities and issues involved in the traditional F2F

delivery of the course. Interviews were done with the course instructor and students (n=5) who participated in 2004 fall semester in order identify the needs and gaps that the participants had in terms of F2F course design and delivery. After this analysis, the researcher decided to conduct a pilot study during fall 2005 to get used to the context of the course, and research environment as well as get experienced for the research and design of the learning environment.

*2. Pilot design and development:* For the fall 2005 semester, the course was redesigned in the blended format. A course management system was used to design the online portions of the course. F2F environment and online environment were designed accordingly. A usability test was done to assess and improve the online environment through user tests and expert checks.

*3. Pilot implementation:* As a pilot of the course design, the course was offered in the blended format during fall 2005 semester based on the pilot design considerations. The researcher was the instructor of the course who was responsible of all course design considerations.

*4. Evaluation of pilot design:* Throughout the pilot implementation semester and after the semester, qualitative data from students and the instructor's own were collected in order to evaluate the course format in blended design. For this aim, the researcher as the course instructor took notes about the design, development and implementation of the course, and encouraged students to reflect their ideas in online environment. At the end of the semester, she conducted interviews with 10 students to gather data about their experiences together with their preferences, needs, and problems, and their perceptions to these experiences.

5. *Refinement of needs:* After the pilot study, the researcher refined the needs for the actual study implementation based on the results of data analysis, the reflections of colleagues during the conference presentations on the findings, related literature and best practices on blended learning environments. This period consists of May-September 2006.

*6. Revision of course design:* Together with the results of the refinement needs and taking Merrill's five principles of instruction into consideration, the course was revised for the fall 2006 semester. In addition the data collection tools were developed. In this regard, the researcher developed two questionnaires to gather data from students at the beginning and end of the semester. After expert checks, she piloted questionnaires with 102 students who were in upper grades (juniors and seniors who took the course in

previous semesters) and after making the required revisions, collected data from students. It is believed that the experiences she had during the pilot semester helped the researcher frame the questionnaires and student reflection papers. This period covers the same period with the analysis step.

*7. Actual implementation of the course:* In fall 2006 semester, course was implemented with the final design of the blended learning environment. This time, researcher as the instructor began collecting more data from the beginning of the semester through the end. She took notes during the design and implementation of the course. She also gathered weekly data from students in the form of reflective papers. In addition to these, she asked help from 3 peers to attend lectures, observe the blended environment and take notes.

*8. Final evaluation:* During and after the course implementation period in fall 2006 semester, data were collected from students who had taken the course and peers who had observed the blended environment regarding their perceptions and experiences. In addition to these data, instructor reflections were collected via weekly diaries throughout the semester. At the end of the semester, semi structured interviews were done with students and peers. After the analysis of all data, the results were interpreted and written in the dissertation format.

The procedure during research is summarized in Table 3.1 with related research questions and data gathering instruments. Table 3.2 is provided in the following page in order to demonstrate the relations of procedures with the research questions.

**Table 3.1** Timeline of the Study with Related Procedures

| Date | Process | Procedure | Implementation |
|---|---|---|---|
| March-May 2005 | - Needs analysis | - Qualitative study on CEIT 209 course in traditional format<br>- Literature review | A preliminary study with students and instructors before the pilot study to be familiar of the context of the course and explore the needs in traditional format. |
| June – Sept 2005 | - Pilot design and development | - Design of the course in blended format | Together with the results of the qualitative study, the course was designed in blended format. |
| Sept 2005 - Jan 2006 | - Pilot implementation | - Usability testing<br>- Pilot study | A usability testing was done with students and experts. Improvements were done in the study design accordingly. Implementation of pilot study period began. |
| Jan-May 2006 | - Evaluation of pilot design | - Interviews with students<br>- Analysis of data collected in pilot study<br>- Revision of RQs<br>- Revision of literature review | Pilot study data collection and analysis were done. Research questions were clarified in need. |
| May-Sept 2006 | - Refinement of needs<br>- Revision of the design of the course | - Revision of the course design and research with pilot results<br>- Preparation of questionnaires and guides<br>- Pilot testing for questionnaires | The research process was redesigned with improvements. Questionnaires were piloted and finalized. Related documents for students and guides for the researcher and peers were developed. |
| Sept 2006-March 2007 | - Actual implementation of the course<br>- Final evaluation | - The implementation of the actual study period<br>- Data collection from students, peers, & researcher's own | Data collection from each participant had begun. Students were administrated questionnaires and asked for reflection papers. Instructor collected data through a diary, and peers observed and took notes on the learning environment throughout the semester. Interviews were conducted with peers and students at the end of the semester. |

**Table 3.2** Summary of Procedure with Research Questions and Data Gathering Instruments

| Research Questions | Instruments | The Procedure |
|---|---|---|
| 1. What are the instructor's experiences while designing a course in a blended learning environment? | | |
| 1.1. What are the considerations during analysis? | Instructor Diaries | Researcher's reflective diaries on the factors that promote (enablers) and impede (barriers) her course design endeavors. These diaries included weekly-daily experiences. |
| 1.2. What are the considerations during design and development? | Peers' Observations | Observations of peers on the factors that promote (enablers) and impede (barriers) course delivery in FTF & Online environments. Peers attended lectures to take notes on their observations, and revised and reflected ideas for the online environment. |
| 1.3. What are the enablers of the use of blended learning environment? | Interviews with peers | A semi-structured interview including questions based on their reflections about their perceived enablers and barriers for the learning environment was done with each peer at the end of the semester. |
| 1.4. What are the barriers to the use of a blended learning environment? | Interviews with students and instructor | *Interviews in needs analysis period:* done with five students who took the CEIT 209 course and one instructor who offered the course in traditional format. The aim was to gather data on the needs and gaps that students had in terms of F2F course design and delivery. |
| 2. What are the students' experiences on the enablers of and barriers to learning in a blended learning environment? | | |
| 2.1. What are the students' perceptions of the enablers to learning in a blended learning environment? | Students' weekly reflections | Students were asked to reflect their ideas for the most promoting and impeding event after FTF lectures. |
| | Forum, E-mail, & Website use logs | Students were also asked to write the problems they face, or suggestions they want to offer in forum environment. E-mails and website logs also served for indicating the enablers and barriers they faced. |
| 2.2. What are the students' perceptions of the barriers to learning in a blended learning environment? | Interviews with students; Student Perceptions Questionnaire | *Interviews after implementation period:* At the end of the semester, students were asked to gather their perceptions about the enablers and barriers for the learning environment. They were semi-structured. After a pilot test, the questionnaires were distributed to the students at the end of the semester. The items included questions about the enablers and barriers they faced. |
| 2.3. What are students' perceptions of the necessary conditions for blended learning environments? | Student Profile Questionnaire | After a pilot test, the questionnaire was distributed to the students by the instructor at the beginning of the semester. The items included background info questions, their perceptions on blended environments for the course, and how comfortable students feel on certain activities that will was about to take place during course period. |
| 3. What are the critical issues to the use of a blended learning environment? | | Overall instruments throughout the whole process |

## 3.3 The Course Context

Under this heading, CEIT 209 course context that made up the focus of this study, the development of instruments, and the participants that form the sample of the study are explained. For the overall strategic framework, Patton (2002) suggested different categories for design, data collection and fieldwork, and analysis. According to this categorization, design strategies fall under three: naturalistic inquiry in which the real-world situations are investigated in their natural framework, emergent design flexibility in which the researcher adapts inquiry as situations/understandings change, and purposeful sampling in which cases for study are selected due to their information-rich nature. From these strategies, this study embraced a purposeful sampling strategy where the course context under study was selected to illuminate the phenomenon with useful manifestation. Patton described the information- richness as the wealth of information that the case can reveal for the central issues of the phenomenon. In purposeful sampling, the researcher selects information-rich cases to learn a great deal about the central issues of the study. Therefore, the design of this study offers a purposeful sampling design in terms of providing information-rich data through a course offered to sophomores.

As mentioned previously, CEIT209 is an undergraduate course offered to sophomores in the CEIT Department at METU (see Appendix A for course syllabus). This 3-credit course was offered to sophomores in fall semesters. The content included the historical background and development of Computer Aided Instruction (CAI), current formats and status of CAI, and the instructional design process for creating a CAI project. Being an introductory course, the course consisted of the presentation of the theoretical knowledge and provided project-based applications for students to practice the theories learned. Therefore, after discussing the fundamentals of CAI, the students were required to create a CAI project by engaging in the Instructional Design (ID) process. The description of the course as given in General Catalog 2003-2005 of METU is as follows:

> Common formats and evaluation principles used in computer aided instruction including drill and practice programs, tutorials, simulations, educational games, demonstrations are introduced.

The students were encouraged to read established research in the area of CAI and the instructional design process for a CAI project development, and discuss it in class (see Appendix B for sample lesson plan and course schedule). During lectures, the instructor

presented the theoretical information and discussed it with the students. Students also assessed several CAI programs in regard to the theoretical framework introduced. The students were required to apply what they had learned theoretically in the project development of their own tasks. Five guest speakers were invited to tell their experiences related with the content of the course session. The instructor introduced the elements of the Web site to the students in the very first lecture hour. All users were registered using a username and password for security and personalization reasons. They were also monitored with logs. The students were encouraged to change their passwords (since it was a general one created for them) and to send feedback if they met with any challenges.

### 3.3.1 Usability Test

A user test was conducted in order to figure out whether the users could find the information needed and do certain tasks in an efficient and effective way while using the course Web site. In order to control and compare the findings of the user test, three experts were asked to rate the usability of the site using Nielsen's Heuristics (Nielsen, 2005).

The user test consisted of 13 scenarios and 3 open-ended questions requesting users' comments and suggestions on the design of the site. The user test was developed by the researcher and asked experts to comment on the clarity of content. After three revisions, the user test was conducted with seven users (five males and two males), five of which were sophomores and two were doctoral students in CEIT department. While none of the users had used the site before, they were advanced Internet users. They were asked to complete the set of the tasks. During the test, a screen capture program (Snag-it) was used in order to record user actions both graphically and sequentially. After completing each task, users were told to navigate to the homepage which initiated the background timing and also complete tasks fully. They were also advised to behave as if they were in their homes and to think aloud as they did the tasks. The researcher took notes with a task schedule while the user did the tasks required in each scenario.

While preparing the scenarios and taking notes during user tests, the researcher considered the measurement items as Calongne (2001) offered. Once user test has been conducted, they were analyzed in an iterative process to reveal what needs refinement and change. The analysis results are presented regarding the measurements of Calongne (2001) as in the following:

- How long does it take for each page to load?
- How responsive is the system to a user's request?
- Does the user go to the wrong web pages when seeking specific information?
- Are there navigation problems?
- Is the message unclear or hard to understand?
- Does the site support the user's behavior during the performance of these tasks?

After user tests, three experts evaluated the web site according to Nielsen's Heuristics. One expert has used the site before, while two had not used it at all. Being PhD candidates with an interest in Usability testing, they were very experienced. Based on the results of the usability tests, the researcher improved the design of the online environment before the pilot.

### 3.3.2 Pilot Study

The aims of the pilot study were to have an in-depth analysis of the content and context of the course, to get familiar with blended learning environments, and to identify potential problems with the procedure or tools to be used in research. Therefore, this period can be said to act as a needs analysis period. One of the main contributions of this pilot study was getting experienced in the context of the study throughout a semester period.

For the pilot study, the researcher designed the CEIT 209 course in blended format in which Web environment was integrated within traditional F2F course. Before the design of the course, she interviewed students (n=5) who took the course in 2004 fall semester and the previous course instructor in order to gather data on their experiences and perceptions on the F2F delivery aspect of the course. With the results of these interviews and the examination of the context of the course, the researcher designed a Web site for fall 2005 semester, and designed the course in blended format. The findings of this preliminary study served as considerations of the analysis period of the study.

In fall 2005 semester, the researcher was the course instructor and collected data for the pilot study with the consent of participants. At the beginning of the semester, she initially assessed the usability of course website through user tests and expert checks which are described later. Throughout the semester, she took notes about the implementation and evaluation of the course, and encouraged students to reflect on their ideas in online

environment. At the end of the semester, she conducted interviews with 10 students to gather data about their experiences together with their preferences, needs, and problems, and their perceptions of these experiences. These students were selected purposefully to include those who were active both in F2F and online environments (n=5), who were active in F2F environment but passive in online environment (n=3), and who were passive in the F2F environment but active in online environment (n=2). The reason behind this was to investigate the characteristics of each environment in the eyes of students with different perspectives and participation levels.

After the pilot study, the researcher redesigned the course with several improvements based on the results of data analysis and the reflections of colleagues during the conference presentations on the findings. From the researcher's perspective, one of the main lessons learned was the need for different perspectives to be involved in F2F sessions. This emerged the idea to involve peers to classroom so that they observe and give more information on the blended learning environment with different lenses. Other than this, she was now experienced a bit more on what it meant to design a blended course, but lacked timely information on the experiences. That is, she lacked a diary within which to record her immediate experiences and thoughts. The experiences she had during the pilot semester also helped her frame the questionnaires and student reflection papers.

Before the course began, the researcher developed two questionnaires to gather data from students at the beginning and end of the semester. After expert checks, she piloted questionnaires with 102 students who were in upper grades (juniors and seniors who took the course in previous semesters) and after making the required revisions, collected data from students. In fall 2006, she conducted the course in the blended format. She took notes during the design and implementation of the course. She also gathered weekly data from students in the form of reflective papers. In addition to these, she asked help from 3 peers to attend lectures, observe the blended environment, and take notes.

### 3.3.4 Revision of Course Design in Blended Format

After the pilot semester, the course was revised taking the instructor experiences and the results of the end-of-semester student interviews into consideration. The aim of the course instructor in revising the environment was to provide learners with a flexible and rich

learning environment in the context they were engaged, which would support interaction and allow student collaboration and cooperation. The first principles of instruction (Merrill, 2002) described in the literature review part were taken into consideration as the main framework of the course design since it was believed to provide an appropriate foundation. The strategies taken for the design and development of the study are given in detail in the results section since they were part of the considerations of the design of the course.

### 3.3.5 Course Web Site

The course web site was designed using a learning management system (LMS) developed by Özden and Ersoy (Özden, 2002). This LMS had been in use in other courses as well. It offered the instructor an easy-to use layout for uploading documents and maintaining the course components online. It was developed using Active Server Pages (ASP) technology and was improved over time. It had three modes: instructor, admin, and student modes. Course assistants and instructor used the instructor mode in uploading and managing documents and tracking student involvement. The interface that the instructor used for managing the site is provided in Figure 3.5.
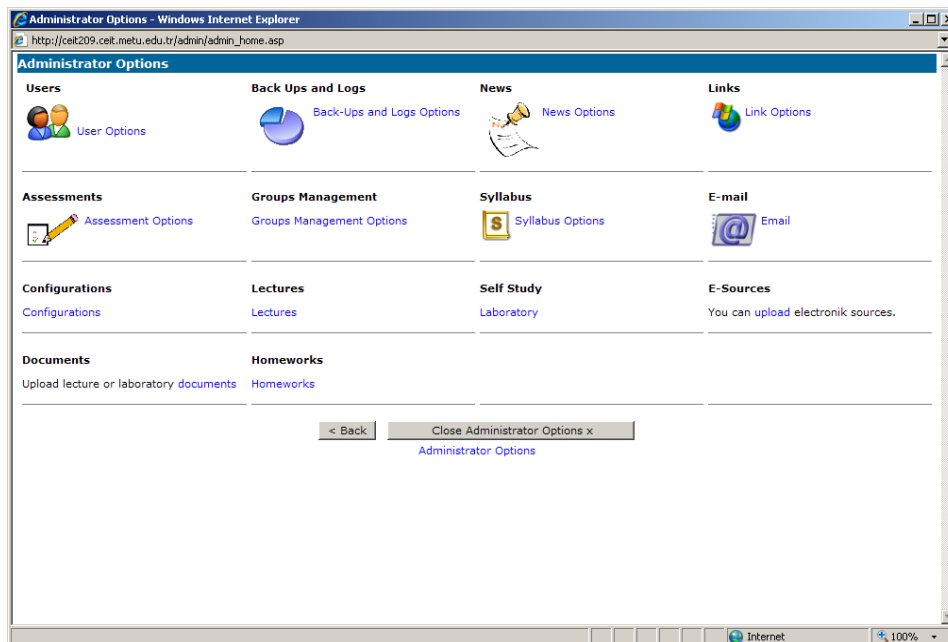


**Figure 3.4** Administrator Page for the Course Instructor

The main categories of the site included a general menu on the left side ordered with text-buttons, an icon-based menu under this general menu on the left including communication and collaboration tools, and a layout on the rest of the page for the presentation of the information. The initial page is given in the figure (Figure 3.6). The left-frame menu included the following items:

**Introduction page:** This is the very first page of the web site (see Figure 3.6). At the top of the page included the latest news as a reminder. Then it included a general description of the course, information about the time and place of the course, and basic information about the instructor.

**Objectives:** This page included information on the objectives of the course with detailed description of the course content and related textbooks and format of the course.

**Syllabus:** This page provided students with a detailed course syllabus, which was maintained through a table including dates, activities, and assignments.

**Lecture:** This page contained all the resources used in the lecture hours including Microsoft PowerPoint presentation slides, documents used in the course, and an online presentation document that the instructor recorded as a detailed resource.

**Grading:** In this page, grading information together with related percentages was provided. It also included a link about the weekly site usage.

**Homework:** This page contained the student homework assignments with due dates. Detailed information and the related resources were given in document links.

**Links:** This page included all related Web links on the course content. A brief information for each link was provided with reminders about the related topic.

**e-Sources:** This page included extra readings from different textbooks, web links, and documents on the content of the course.

**News:** This page included the announcements that the instructor made for students from the most recent to the earliest.

**Instructor:** Instructor and course assistants' information were given on this page. It included instructor photo, e-mail addresses, telephone numbers, office hours, and departmental addresses.

**FAQ:** This page included frequently-asked questions such as how students could find additional information about using the course Web site, what to do when technical problems arise etc.
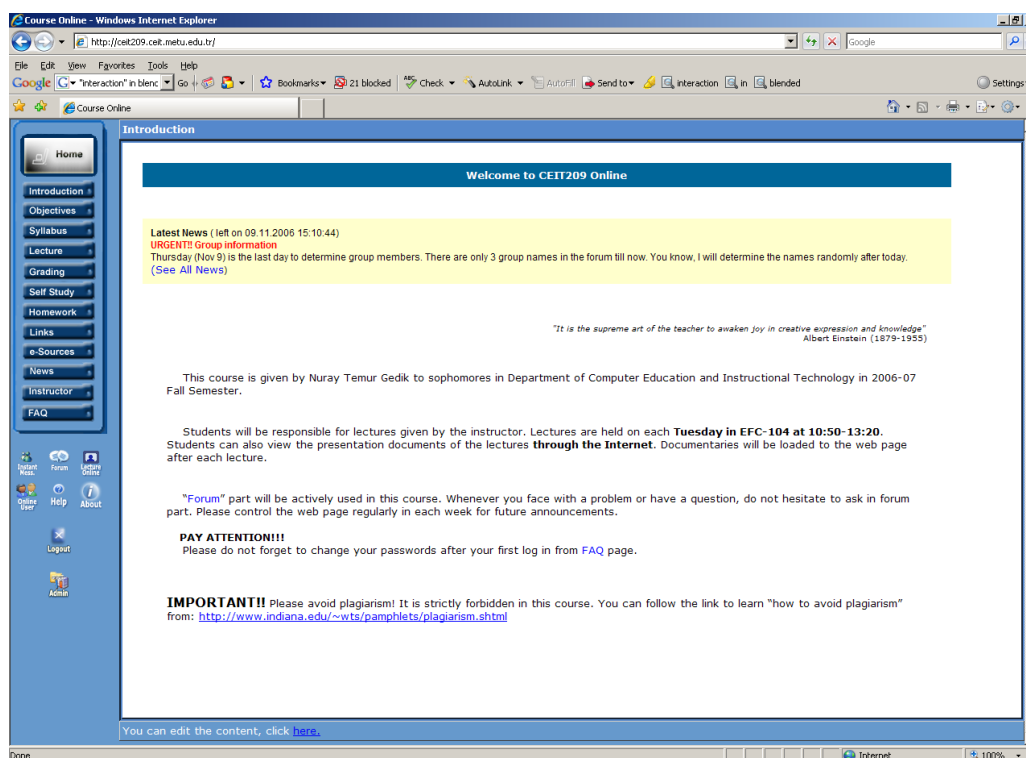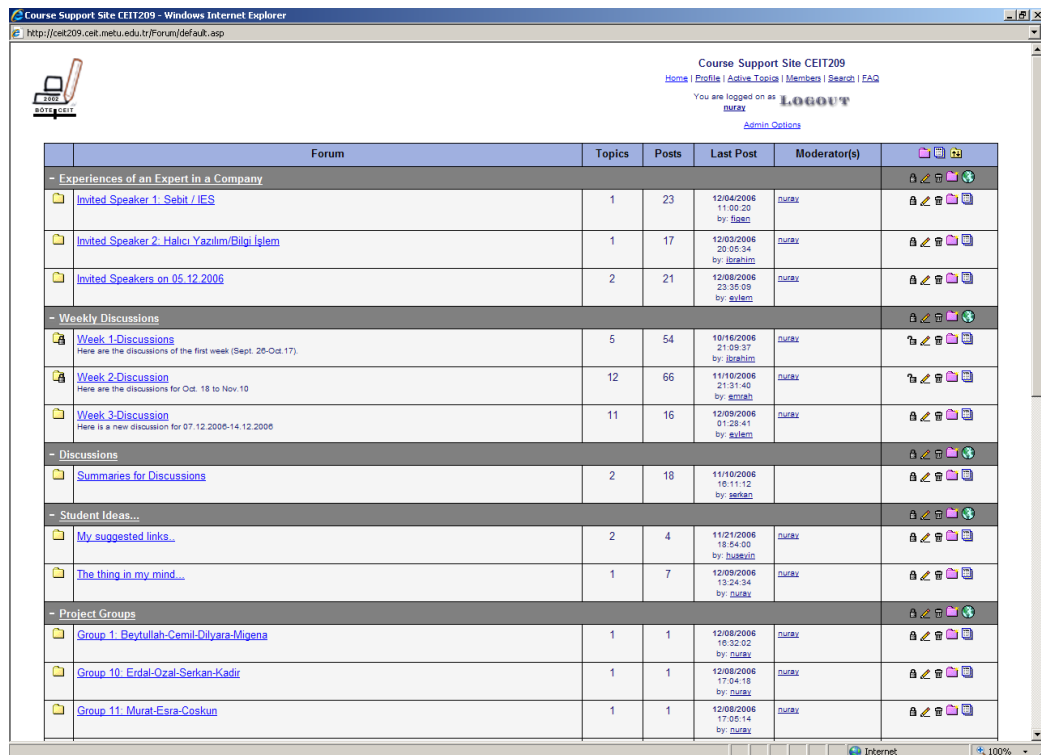


Figure 3.5 Introduction Page

The communication and collaboration tools at the left bottom of the page included instant messaging, forum, and lecture online options. This part also included other status and information icons such as online users, help, about, admin (for instructor and teaching assistants), and logout. In the CEIT 209 course, forum was the main tool used for communication and collaboration (Figure 3.7). When the forum icon was clicked, the

forum page was opened in a separate window with its different interface. It gave information on the main topics, number of posts on each main topic, most recent post information with its author and date, and options to create new posts, comment on topics, close or open the topic (for instructor). The forum allowed students to post their comments under the titles that the instructor created. Students could only post their comments, and instructor moderated all activities.



Figure 3.6 Forum Page

Forum was mainly used for discussing issues on course content, for maintaining a place for student collaboration, and for creating a place for reflection on the course process. Therefore, it had different subheadings with the most recent at the top.

60

## 3.4 Participants

The participants of this study included 40 (27 males and 13 females) prospective teachers enrolled in the CEIT 209 course, the course instructor (researcher of this study), and three peers (two males and one female) who were graduate students working as teaching assistants and familiar with blended settings. Most of the students were graduated from technical and vocational schools which can be regarded as a reason for the vast majority of the male students. The peers observed the learning environment throughout the semester. They attended lectures as observers and used the Web environment to explore the use of the online environment as student. One peer was also the course assistant and observed the F2F environment throughout the semester. Another peer observed the classroom several times during the semester and served as the course instructor two years earlier in traditional format. The last peer observed the classroom several times during the semester. All peers were knowledgeable on instructional design and pedagogical issues regarding online and FTF environments. Two of the peers conducted one blended course before. The other peer did not teach any blended courses, but participated in blended courses as a graduate student and course assistant.

The researcher is a PhD candidate and research/teaching assistant in the same department. She had taken part of this course as a student. Strauss and Corbin (1998) asserted that the sensitivity of a research increases with personal experience. It is believed that having previous experience as a student helped the researcher be more sensitive to the perceptions of the students. Prior to this course, however, she had no experience with blended learning environments in this format before. Due to this limitation, she was guided by experts on her Doctoral Committee having such experiences. She had the roles of being the course designer in blended format and the course instructor. More details are presented in researcher's role in the following section (3.5). As Bogdan and Biklen (1998) noted, since it is difficult to get away from experiences, who you are, and what you believe, the study is affected by researcher's biases. The audio tapings and video tapings, in this sense, were used to check observations objectively (Fraenkel & Wallen, 2000). In addition, it was hoped that the triangulation and peer debriefing methods increased construct validity of the research (Yildirim & Simsek, 2000). All of the student participants and peer identities were kept confidential during analyses. The confidentiality of the participants was also respected by using pseudonyms.

## 3.5 Researcher Role

Researcher's ontological, epistemological, and methodological beliefs, or what is called *paradigm,* shape and guide the research (Denzin & Lincoln, 1994; Guba & Lincoln, 1994). While quantitative methods utilize the positivist paradigm of explaining world through objective facts, qualitative methods employ more phenomenological or interpretative paradigm of involving multiple realities resulting from context. Therefore, the researcher becomes an instrument to the study in qualitative studies which conveys the emergence of some technical (researcher entry and efficiency in her researcher role) and interpersonal issues (ethical and personal dilemmas) that quantitative studies do not have (Marshall & Rossman, 1999). In quantitative research designs, the design itself reduces bias and error, but in qualitative research designs rich descriptions are included showing that the researcher was involved in the process by providing the reader with a detailed description of the situation (Firestone, 1987). Consequently, the researcher conducts "inquiry from the outside" within the positivist paradigm while "inquiry from the inside" in more interpretivist paradigms (Brannick & Coghlan, 2007, p. 61). This study used the inquiry from the inside approach, which is critical to researcher role and hence worth explaining at the first place.

Taking the interpretive framework into consideration, the researcher has taken two roles in this study: first the data source herself as the course instructor, and second a participant observer in collecting and analyzing data from student perspectives. Having an inside researcher role provided the researcher with the "opportunity to learn directly from his own experience of the setting" (Marshall & Rossman, 1999, p. 106) and reflect on the personal insights within a heuristic inquiry process (Douglass & Moustakas, 1985). For this reason, it can be asserted that using a heuristic inquiry approach enabled the researcher to be active in the research (West, 2001) and participate as an insider (Brannick & Coghlan, 2007), and, therefore, the insights and personal experiences of the researcher is of crucial importance to elucidate here. Wirth described the role of including insights to the inquiry as the following (cited in Patton, 2002, p. 53):

> …insight may be regarded as the core of social knowledge. It is arrived at by being on the inside of the phenomena to be observed. … It is participation in an activity that generates interest, purpose, point of view, value, meaning, and intelligibility, as well as bias.

The final concern that Wirth mentioned as "bias" is a controversial issue in terms of the neutrality of the research by having researcher as an insider of the research. According to Patton (2002), it is hard to be neutral in a qualitative inquiry. Since the researcher acts as the instrument in qualitative inquiry, the credibility of the research depends on the "skill, competence, and rigor of the person doing fieldwork…" (p. 14). Given that researcher insights and personal experiences were included as data sources in the study, it may seem more of a threat to trustworthiness (the qualitative term used for validity) at first sight, but it is believed that it provided different advantages as well. First of all, the aim of being part of a setting as a qualitative researcher allowed the researcher "to experience what it is like to be in that setting" (p. 303). Being in the context of the study also helped to "understand how events, actions, and meanings are shaped by the unique circumstances in which these occur" (Maxwell, 1996, p. 19). It also enhanced a strong balance to solving the design problems in context.

In the following paragraphs, researcher background, her set of beliefs and assumptions on the nature of the study, and the reflexive acknowledgements within the heuristic inquiry process are given in order to highlight the role of the researcher and, hence, provide readers a reflective description of the study from her experiences. It is believed that when the researcher recognizes these set of beliefs and "personal purposes that drive and inform research", her awareness of their consequences on the research increase (Maxwell, 1996, p. 16). This provides her with a "valuable source of insight, theory, and data about the phenomena" under study (Maxwell, 1996, p. 16).

The researcher has a BS degree from the department of Computer Education and Instructional Technologies, and has been working in the field of Instructional Technology since then. Her research interests included instructional design applications and learning strategies in technology-based environments. As a student, she has been curious about the integration of Internet technologies into the classroom environment. Prior to this research, she had taken only one course which used an Internet page for the content of the course, but she did not teach any courses with an online component. Although she took many courses on the theoretical basis of using Internet technologies as a support to F2F courses, she did not have a practical experience. Throughout her ID courses, she designed many F2F courses as projects, but it seemed interesting and challenging for her to design a course in an online or blended format. She believed that an interpretative approach would

best suit to design a study examining the experiences of students and instructors. These were the main motives behind conducting this research.

Being a teaching assistant in the department allowed the researcher to be familiar with the socio-cultural context of the department. For this reason, it was not very challenging for her to act as an instructor. It is believed that having the instructor role provided the researcher with the opportunity to be an active participant and natural part of the context of the study in gaining insight into blended learning environments. It also allowed an in-depth analysis of the content of the course, student engagement, and the dynamics of the context of the study while focusing on the phenomena of the inquiry. However, it was certain that the researcher needed to be cautious about not getting stuck in the narrow descriptions of the experiences as an insider and for this purpose, at every stage of the research, she acquired help and feedback from the Doctoral Committee members, the peers who acted as observers, and other doctoral students both interested and non-interested in the topics of the study.

The researcher believes that in pre-service teacher education programs, "learning by doing" should be supported by "instructing by doing" meaning that the instructor should model what is being taught. Therefore, the learning environment should be designed in a way that can support this modeling process and make the course more meaningful for students. In relevance to this, this study aimed to examine the dynamics of designing and implementing such an environment in the CEIT 209 course with the use of a blended format.

Although she agreed with Patton (2002) in having difficulty to be neutral or purely objective in an interpretative paradigm, she aimed to reduce the biases of being an insider. By nature, the heuristic inquiry required the researcher to include her insights and experiences. To increase the trustworthiness of the research, the researcher triangulated her research methods and data sources. The Doctoral Committee Members offered suggestions on reflecting on her own experiences and guided her in the process. With this advice, she kept a diary on her design experiences in which she reflected on her experiences and personal insights to draw her attention to the research context which was very helpful in "discerning patterns of the work in progress, [and] reflecting on previous reflections" (Van Manen, 1990, p. 73).

As aforementioned, Marshall and Rossman (1999) described some set of issues in the role of a qualitative researcher. In the below list, these considerations are listed to describe the researcher role in the present study and hence provide a summary (pp. 79-101):

(1) Technical Considerations:

a. Deploying the self: This issue is about *the degree of participantness, revealedness, intensiveness and extensiveness,* and *focus of the study*. In the continuum of the degree of participantness, the researcher acted as a full participant in having the role of the instructor and as an observer in collecting data from students. Regarding the revealedness, the researcher explained the purpose of the study to students, but as Taylor and Bogdan (1984) suggested, in a vague way. In order to diminish the instructor-researcher factor during interviews with students, the interviews were conducted at the end of the semester when the course grades were already submitted. For the intensiveness and extensiveness continuum, since the researcher was the instructor of the students for the first time, she tried to build trusting relations after the semester has begun, and collected data as pertinent. Finally, for the focus of the study, the rationale and the plans on the research questions were made beforehand and the descriptions were given.

b. Negotiating entry: Regarding the negotiation with the participants, the researcher informed the department head and principals in the related institute about the research issues and showed sensitivity to students' reluctance to participate.

c. Efficiency: Regarding the deployment of resources, especially time and energy, the researcher tried to keep balance by reconciling to the boundaries that she planned in the proposal and she consulted them with doctoral committee members.

(2) Interpersonal Considerations:

a. Reciprocity: The researcher has been aware that the participants gave their time to help researcher and this was very helpful. She tried to be a good listener and an encouraging tutor. She maintained a quiet and safe place where the interviews could take place and thanked the participants for sharing their times and experiences. During all data collection processes, the designs were open for discussion, which was very helpful in clarifying misconceptions on the part of the participants.

b.     Ethics: For the ethical issues, especially in a research study where the researcher was the instructor of the course, the researcher needed to be very careful. She tried to anticipate possible ethical problems and tried to be aware of them and take cautions. First of all, at the beginning of the semester, she told students that she will be asking them to write their reflections on the blended learning environment in a weekly period, but they would be free to write. She explained that she would be using these reflective papers as a source for not only the research purposes but also as a source for making improvements in the course, and so did she. Participation was voluntary for these reflections, which can mean that the real volunteers wrote those reflective papers. Other than this, her researcher role was not mentioned for any assignment or graded activity. She secured the data of the participants and gave pseudonyms for them throughout the data analysis process. She also asked potential interviewees for participation by explaining that it was nothing to do with her instructor role and their relationship as a student-instructor. She asked them to feel free about anything that comes to their minds on their experiences and conducted these interviews after the grades were submitted. The participants were told that they were free to withdraw from the study any time they wanted and had the opportunity to read transcripts to make modifications. They were also told that they would be shared with the results of the data if they wanted. That is, the interviews were aimed to be conducted by informing the participants fully.

## 3.6 Instruments

As stated in previous sections, both qualitative and quantitative data were gathered in the study. Questionnaires, interviews, instructor diaries, students' weekly reflections, peers' observations, and course related documents were the main sources of data. In addition, expert reviews, and peer reviews were gathered. Table 3.4 outlines the data gathering instruments indicating the time and the elements to inquire.

Patton's (2002) framework for the strategies of data collection falls under four categories: "qualitative data, personal experience and engagement, empathic neutrality and mindfulness, and dynamic systems" (p. 40). This study used qualitative data from interviews, observations, and documents and personal experience and engagement for the data collection period. The personal experience allowed the researcher to get close to the phenomenon and the people to "personally understand the realities and minutia of daily life" (p. 48). While it is regarded as a threat to objectivity of the study, it is commonly

accepted that being part of the study increases researcher's attachment to openness and understanding of the nature of the study and, hence, helps in meaning-making and "use all of one's senses and capacities, including the capacity to experience affect no less than cognition" (Patton, 2002, p. 49).
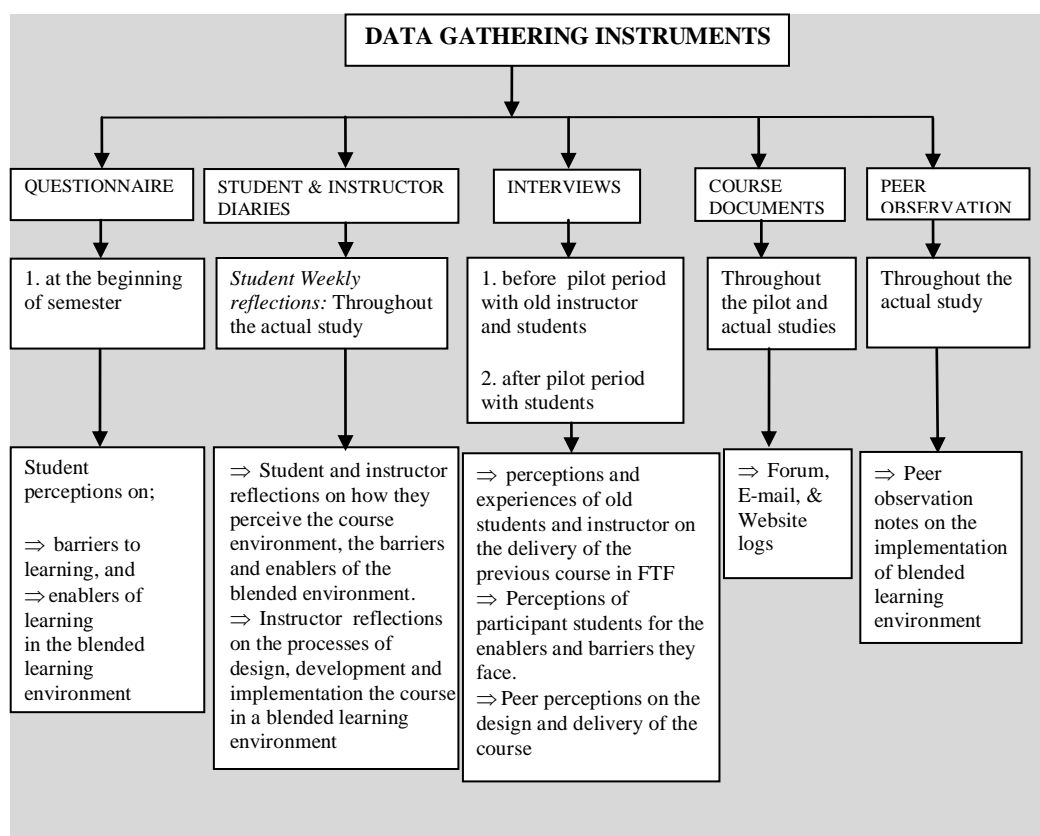


**Figure 3.7** Data Gathering Instruments

### 3.6.1 The Questionnaire:

The questionnaire was designed by the researcher to gather data on the perceptions of students based on their experiences in the blended environment. It consisted of Likert-type items and open-ended questions. The content of the questionnaire was derived from a

literature review on blended learning and authenticity of learning, from conversations with teaching staff, and from the researcher's previous experiences in the use of blended format in teaching and learning. Experts from Doctoral Committee were asked their opinions in order to ensure content validity.

The questionnaire served for validating and extending the information that was captured through personal interviews and providing more data on students' perceptions and reactions on the enables and barriers of the blended delivery of the course. In addition, it was believed that it allowed students to express their ideas without the pressure of a face-to-face interview. The researcher relied on the honesty and accuracy of participant responses as Marshall and Rossman (2006) suggested.

A pilot test with 102 students was conducted in September 2006. After expert and peer suggestions, modifications were made regarding the content and language of the items. After a factor analysis, the 55 items in the second part of the questionnaire was reduced to 23 and the third part was reduced from 41 to 18. The final reliability coefficient (Cronbach's Alpha coefficient) after the factor analysis was found to be .96 denoting a satisfactory reliability (Bryman & Cramer, 1997).

There were four sections in the questionnaire (Appendix C). The first section included 10 questions on the background information. The second and third sections included items that were rated on a Likert-type scale with 1 equaling Strongly Disagree to 5 equaling Strongly Agree. The second section included 23 questions on the enablers of the blended learning environment and the third section included 18 questions on the barriers of the blended learning environment. The last section involved 6 open-ended items to further understand student responses.

### 3.6.2 Student Profile Questionnaire

Student preferences on the course activities were sought at the beginning of the semester via a questionnaire. It included 12 items on students' comfort on certain course activities. The items on the questionnaire were developed based on the activities that were planned in the design of the course (see Appendix D). It was revised by a language expert and members of the Doctoral Committee. Open-ended items were improved with their suggestions and questions formats were clarified after these revisions. Before the implementation of the questionnaire, a pilot study with 54 students was conducted and

after a factor analysis, no items were deleted with the reliability coefficient (Cronbach's Alpha coefficient) calculated as .74 denoting a sufficient score.

### 3.6.3 Student Interviews

Interviews help researchers to "get large amounts of data quickly" (Marshall & Rossman, 1999, p. 108), which constituted the large dataset of this research study. There were three groups of student interviews at different times for different purposes. The first interviews were done with five students who took the CEIT 209 course in traditional format. The main purpose of these interviews was to gather data on the needs and gaps that students had in terms of F2F course design and delivery. The second interviews were done with ten students who participated in the pilot semester of the course in blended format. The purpose of these interviews was to gather data about their experiences on the problems and needs in the blended learning environment. The final interviews were done after the actual implementation. These were phenomenological interviews on students' experiences and perceptions of the delivery of the course in blended learning environment to discern the meanings they placed on their experiences (Kuh, 1993).

The first interviews during the needs analysis period were done with students using a convenience sampling method. The pilot interviews and final interviews were done using a purposeful sampling strategy. These interviews were very helpful in investigating participants' perceptions with different perspectives and participation levels. The researcher used the following criteria for the selection of participants (Patton, 2002): being active both in F2F and online environments (n=5), being active in F2F environment but passive in online environment (n=2), and being passive in the F2F environment but active in online environment (n=3).

For each interview, an interview guide was developed (Appendix E and F). After developing the interview guide, the researcher asked Doctoral Committee members and three peers for clarity and content validity. According to Merriam (1998), "semi-structured interviews allow for a mix of more-and less-structured question" (p. 72). During these semi-structured interviews, the researcher asked further questions appropriate to the flow of the interview. The interviews were audio taped with the consent of participants who were "promised to reveal the findings to those who are interested" (Fraenkel & Wallen, 2000, p. 463).

### 3.6.4 Student Reflections

After every F2F session, students were asked to reflect on their best experiences and most challenging problems in learning course content. By encouraging learners to think about and reflect on their F2F and online activities, it was also aimed that these reflections would provide data on students' perceptions for the blended course and also help them "foster a deeper processing and better retention of the contents to be learnt" (Nückles, Schwonke, Berthold, & Renkl, 2004, p. 49).

A template was developed by the researcher (Appendix G) so that students could use it while writing their reflections. This guide document included two open ended questions for students that asked them to reflect on their ideas about the best and worst parts of the course and three Likert-type questions that asked them the contributions of F2F and online portions of the course and their perceptions to workload for the week. After each item, there was a space for students to include their reasons for why they responded so. A total of seven reflection papers were gathered from students. For tracking students' progress over time their names were gathered for the reflection papers.

### 3.6.5 Instructor Diaries

Diaries supplement the data retrieved from interviews or observations in a heuristic inquiry research (Moustakas, 2000). Experience and perception of a phenomenon has a linguistic structure which makes texting a "reflective writing" part of the study (Van Manen, 1990, p. 38). The instructor as the designer of the course reflected on the processes of how she designed, developed, and implemented the course in a blended learning environment. The diaries of her experiences taken out of the analysis period lasted for a long time period including a preliminary study and a pilot semester. The diaries during the design and development period included her reflections after pilot semester. While they were mainly in the form of informal notes about her experiences, a reflection guide was prepared for the implementation period including guideline questions on student learning, the problems faced, and reflections on the online and F2F portions of the course (Appendix H). The diaries were written after each F2F session, and on weekends for Web environment. These notes were used as documentaries that included the experiences of the instructor, and they were collected separately in the two environments since each required different considerations throughout the course. As

Patton (2002) suggested, feelings, reactions, insights, interpretations, and inspirations as well as descriptive field notes were recorded in those notes as part of the data.

### 3.6.6 Documents

The course materials and the e-mail/forum logs were gathered to analyze the processes of development and implementation of the course. They also served for examining the nature of the design of the course and students' perceptions of the delivery of the courses.

### 3.6.7 Peer Observation Notes

Three peers observed the F2F sessions throughout the semester and reviewed the online environment. They took notes on their observations which were unstructured and mainly focused on the teaching-learning process.

### 3.6.8 Peer Interviews

To support peer observation notes, semi-structured interviews were conducted with the peers at the end of the semester. For the semi-structured interviews with peers, an interview guide was developed by the researcher (Appendix I). It included items related to enablers and barriers of instructing in the blended environment. The guide was examined and revised by the experts of the Doctoral Committee and the interviews were done at the end of the semester (January 2007). The peers were asked about their observations and comments on the delivery of the course both in online and F2F parts. The interviews mainly concentrated on the following:

- · Instructor role in the online and F2F settings as an IDer,
- · Enablers of the blended learning environment for the course instructor,
- · Challenges in implementing the blended learning environment for the instructor.

### 3.7 Analysis of Data

As the main data collection approach was qualitative in the study, the study embraced an interpretative framework for data analysis that involved the interpretation of "meanings made both by the social actors and by the researcher" (Miles & Huberman, 1994, p. 8). The researcher followed the common analytic approach for analyzing the qualitative data as suggested by Miles and Huberman (p. 9):

1. Affixing codes to a set of field notes drawn from observations or interviews
2. Noting reflections or other remarks in the margins
3. Sorting and sifting through these materials to identify similar phrases, relationships between variables, patterns, themes, distinct differences between subgroups and common sequences
4. Isolating these patterns and processes, commonalties and differences, and taking them out to the field in the next wave of data collection
5. Highlighting generalizations relating them to your original research themes
6. Taking the generalizations and analyzing them in relation to theoretical perspectives.

To further illuminate, the analysis of the qualitative data (e.g., peer observation notes, instructor diaries, student reflections, other course documents, and open-ended responses from questionnaires) was done as follows: The researcher identified descriptive codes and notes in the margins of the pages. *An inductive coding scheme was used in this process that required a systematic process into analyzing the data without predefined codes.* Then, she assembled these codes into categories to have a general idea of what emerging themes will be. After this first-level coding, all the categories from each document were grouped under major themes considering the scope of the research questions. These themes provided the researcher with the opportunity to present findings under certain sub-headings. In the analysis of peer and student interviews, qualitative analysis software was used (QSR Nvivo 8), which eased the process of coding, grouping, and organizing the data onto categories and themes. These common themes were then grouped into generalizations and synthesized into final themes. While finding these common themes, the researcher tried to reveal the phenomenological essences of the experiences as Moustakas (1994) suggested. For this purpose, she identified the significant statements throughout the analysis process and stored for later use.

It is important to note here that two groups of data were analyzed separately for the two research questions: 1) students' perceptions and experiences, and 2) instructor's perceptions and experiences. In this process, student interviews, questionnaires, student reflection papers, and course documents were analyzed together for the students' part while instructor diaries, peer observation notes, interviews with peers, and course documents were analyzed together for the instructor part. The findings from each process

were then combined and analyzed again to answer the third research question regarding perceptions of critical factors for designing successful blended learning environments. After the completion of data analysis, peer review strategy was employed for validity and reliability concerns (Lincoln & Guba, 1985; Merriam, 1998; Miles & Huberman, 1994). For this aim, two peers were asked to review the data to check for the coding and interpretation of categories and themes emerged from the codes (detailed information on peers are given in the following section). Each peer coded random sample data from the peer, instructor, and student dataset separately. After that, the peers and researcher reviewed their codes together and calculated the inter-coder reliability score with the following formula (Equation 1) by Miles and Huberman (1994, p. 64):

$$\text{Reliability} = \frac{number\ of\ agreements}{total\ number\ of\ agreements + disagreements} \qquad \text{Eq. 1}$$

The agreements were determined when any of the reviewers agreed with the researcher and disagreements were determined when both reviewers disagreed with the researcher. In addition, the items found as important codes by the reviewers but not by the researcher were also categorized as disagreement items. The level of agreement was calculated for the inter-coder reliability as 74% for instructor data, 88% for student data, and 91% for peer data, denoting a satisfactory score (Miles & Huberman, 1994). The overall score using the scores of each data source in the calculation formula was found to be 86%. After the review of the coding, the peers and researcher discussed the categories and themes and made revisions on the final interpretations, insights, and the excerpt significance.

Although the primary analysis was based on the qualitative data, the quantitative analyses were also done for the quantitative data. The quantitative data analysis consisted of descriptive statistics to determine the means, standard deviations, frequencies and percentages by using the Statistical Package for Social Science (SPSS, Version 12). It aimed to respond to the inquiry on the perceptions of students on the delivery of course in blended format with a focus on enablers and barriers of the learning environment to their learning.

Patton (2002) specified that the decision for appropriate unit of analysis depends on what the researcher decides he/she wants to be able to say at the end of the study. He provided five categories for the analysis strategies: unique case orientation; inductive analysis and creative synthesis; holistic perspective; context sensitivity; and voice, perspective, and reflexivity. This study used an inductive analysis, creative synthesis, and reflexivity by "immersing in the details and specifics of the data to discover important patterns, themes, and interrelationships; … [by] exploring, then confirming; guided by analytical principles rather than rules; end[ing] with a creative synthesis" (p. 41). Reflexivity is another approach incorporated in the study with the following suggestions made by Ahern (1999) to identify and hence minimize potential biases:

1. Identify some of the interests that, as a researcher, you might take for granted in undertaking this research. Write down your personal issues in undertaking the researcher, the assumptions associated with your gender, race, socio-economic status, and the political milieu of your research.

2. Clarify your personal value systems and acknowledge areas in which you know you are subjective. These are issues to which you need to keep referring back when analyzing your data.

3. Describe possible areas of potential role conflict. Consider how this possibly could influence whom you approach or how you approach them.

4. Identify gatekeepers' interests and consider the extent to which they are disposed favorably toward the project. This can help you prevent potential role conflicts.

5. Recognize feelings that could indicate a lack of neutrality.

6. Is anything new or surprising in your data collection or analysis? If not, is this cause for concern, or is it an indication of saturation? On occasion, stand back and ask yourself if you are "going native." Consult colleagues before you assume that you have reached saturation in your data analysis.

7. When blocks occur in the research process, re-frame them. Would an additional form of data collection, such as document analysis or diaries, give a greater insight?

8. Even when you have completed your analysis, reflect on how you write up your account. Are you quoting more from one respondent than another? If you are, ask yourself why. Do you agree with one person's sentiment or turn of phrase more than those of another? If so, go back to your analysis and check that an articulate

respondent has not biased your analysis by virtue of making your analytic task easier.

9. In qualitative research, the substantive literature review often comes after the analysis. Consider whether the supporting evidence in the literature really is supporting your analysis or if it is just expressing the same cultural background as yourself.

10. A significant aspect of resolving bias is the acknowledgment of its outcomes; therefore, you may have to re-interview a respondent or reanalyze the transcript once you have recognized that bias in data collection or analysis is a possibility in a specific situation (pp. 408-410).

Reflexivity is very critical in terms of researcher bias and details on this issue are provided in the following section (section 3.8).

**Additional Considerations:**

- For the qualitative analysis, Lofland (1971) argued that researchers need to learn the categories of participant responses to open-ended items to capture their own terms which can reflect the reality of the lived experience (cited in Patton, 2002, p. 21). For this aim, the researcher of this study tried to embed the excerpts of participant responses which were captured as direct quotations from their responses.

- It is important to note that most data was in the form of Turkish. Questionnaires, interviews, student reflection papers, peer observation notes, and instructor diaries were all in Turkish. Due to the medium of language being English in courses, the related course documents and forum transcripts were in English. For the nature of this study, the researcher translated the direct quotations from Turkish to English herself.

## 3.8 Trustworthiness

The trustworthiness of a research is related to the procedures followed to ensure validity and reliability. Ensuring validity and reliability for qualitative and quantitative differs as "the quantitative study must convince the reader that procedures have been followed

faithfully while the qualitative study provides the reader with a depiction in enough detail to show that the author's conclusion makes sense" (Firestone, 1987, p. 19). The terminology for referring to the terms internal and external validity, reliability, and objectivity which were originated in the quantitative research approaches has been replaced by credibility, transferability, dependability, and confirmability in qualitative research (Denzin & Lincoln, 2005). Although the qualitative jargon is preferred since the main approach of the study is qualitative, the terms are used interchangeably in this study.

Different methods were used in order to ensure trustworthiness in the research. They include content validity, triangulation, member checking, persistent observation, peer observation and debriefing, and reflexivity. In this study, the Doctoral Committee has served as the external experts and assessed the trustworthiness. In addition to these experts, peers served as outsiders to help the researcher as well. It can also be noted that the pilot study period enhanced consistency.

Content validity was provided by asking expert opinions. Content validation deals with the content and format of the instrument (Creswell, 2005; Fraenkel & Wallen, 2000). Doctoral Committee members examined the instruments, and guided the researcher for content validity of the questionnaires, interview guides, and other course documents. It is believed that these expert reviews increased the credibility of the research with critical eye application (Patton, 2002).

In this study, triangulation was provided using different methodologies, as it adds "rigor, breadth and depth to any investigation" (Denzin & Lincoln, 1994, p. 2). Data triangulation was used for providing in depth understanding of the phenomenon in question (Denzin & Lincoln, 1994; Miles & Huberman, 1994). It was done by providing multiple sources of data like questionnaires, interviews, student reflection papers, instructor diary, peer observations, and course documents to validate the results of each other. Methods triangulation was done for student experiences and perceptions by "comparing and integrating data collected through some kind of qualitative methods with data collected through some kind of quantitative methods (Patton, 2002, p. 556). The qualitative data was composed of interviews, reflection papers, and open-ended items in questionnaires while the quantitative data involved the Likert-type questions in the questionnaire. During the analysis and interpretation, these different data were combined and compared.

Investigator triangulation was used to ensure trustworthiness with the involvement of outsiders to the study including Doctoral Committee Members and peers.

Member checking allows the validity concern moving from the researcher side to the participant side. In this study, the researcher asked the participants to read and provide feedback on the interview transcripts that would confirm the credibility of the information that the researcher has interpreted.

Persistent observation was ensured as the researcher was the part of the study in the instructor role. It was designed to provide opportunity to explore the classroom environment and online environment deep enough to relate past experiences, but stay focused on the scope of blended environment. As Craig (1978) pointed out (p. 20):

> … This mode of inquiry [heuristic approach] affirms the possibility that one can live deeply and passionately in the moment, be fully immersed in mysteries and miracles, and still be engaged in meaningful research experience. As an approach to research it encourages the individual's discovery through uniquely designed steps of procedure, meaning and articulation.

Peer debriefing or review is defined as "asking colleagues to comment of the findings as they emerge" (Merriam, 1998, p. 204). As a strategy of validity, Johnson (1997) described peer review as the debriefing of researchers' interpretations and the insights with outsider peer(s) that can play devil's advocate. The researcher asked the Doctoral Committee to give feedback on the findings resulting from the data obtained from questionnaires, interviews, student reflection papers, instructor diaries, peer observations, and the other course documents. Other than this, she asked four peers who were doctoral candidates in the same department to provide feedback (Maxwell, 1999), two peers helped the researcher throughout the data collection process while the other two helped in data analysis and interpretation processes. The first two peers had experience in collecting both qualitative and quantitative data before. They were both TAs in the department and one of them taught a course to the CEIT209 students in previous year. The other peers who helped in the data analysis and interpretation processes in terms of reviewing the data and interpretation were TAs in the department as well. One of them conducted an extensive qualitative case study and was engaged in another case study, which can be indicated as an

attribute of the peer's experience in qualitative data analysis. The other peer had experience in qualitative data analysis in several researches as well. They were all familiar with the blended learning context from their graduate course and teaching experiences. The level of agreement was calculated for the intercoder reliability as 74% for instructor data, 88% for student data, and 91% for peer data, denoting a satisfactory score (Miles & Huberman, 1994). The overall score using the scores of each data source in the calculation formula was found to be 86%. The peer review process also included the debriefing of peers and researcher on the interpretations, insights, and the excerpt significance. Therefore, it can be said that the high percentage of the agreement on the codes not only increased the reliability of data analysis, but it also enhanced additional insights to the researcher in conclusion drawing.

Finally, the issue of reflexivity is the strategy that is one of the most critical for ensuring trustworthiness of the study. Patton (2002) described the instrument of a research study to be the "researcher" (p. 14), which means the researcher's skill and competence, as well as his/her rigor and the things/personal experiences the researcher is having play important role in the credibility of the research. Therefore, the researcher's role needed to be explained and illuminated in detail. As Ahern (1999) pointed out "subjective awareness is beneficial to qualitative researchers" (p. 408) and in this regard, the researcher has included her role and also kept a diary to be more aware of her role as the researcher. A sincere investigation and realization of the values and interests of the researcher and the awareness of being the part of the social world in the study environment helped in the reflexive process of the research and hence increased the rigor of the study (Ahern, 1999). That is, in the interpretive framework of qualitative paradigm, the main concern is the understanding of the influences of researcher values on the conduct and conclusions of the study, not the elimination of these values (Maxwell, 1996). As Barab and Squire (2004) mentioned, design-based researchers are the ones who create the interactions on which they are investigating in its naturalistic context, which makes this research more potentially helpful methodology.

A last concern is the generalizability of the results. This is related with external validity (Merriam, 1998). With the design based nature of the study, it is hard to generalize the findings for other settings since "the effectiveness of a design is no guarantee of its effectiveness in other settings" (Collins et al, 2004, p. 18). However it is hoped that the

contextualized nature of DBR can yield a guiding document for similar design contexts or even contribute to broader contexts (Gravemeijer & Cobb, 2006). As Collins et al. emphasized (p. 21):

> Design experiments are contextualized in educational settings, but with a focus on generalizing from those settings to guide the design process. They fill a niche in the array of experimental methods that is needed to improve educational practices.

Use of full description of the design processes was a strategy used to increase the trustworthiness and generalizability of the research suggested by McKenney et al (2006, p. 86):

> While the generalizability of design research is limited, full descriptions will help the readers of such portraits gain insight on what happened during research stages and make inferences based on (or transfer) the findings to other situations (external validity).

The full descriptions were enhanced through the use of phenomenological approach that also improved the depth of interpretations from the participant data. As a final remark, it is anticipated that with the phenomenological approach that this study embraced, other researchers working on similar learning environments can benefit from the findings of this study (Eichelberger, 1989).

A summary of the chapter on research questions, data sources, data gathering instruments, types of data collection and data analysis is given in Table 3.5.

**Table 3.3** Summary of Research with Related Research Questions and Data Sources, Instruments, Data Collection Types, and Data Analysis

| Research Questions | Data Sources | Data Gathering Instruments | Types of Data Collection | Data Analysis |
|---|---|---|---|---|
| 1. What are the instructor's experiences while designing a course in a blended learning environment? | Instructor | Instructor Diary | Qualitative | Content Analysis |
|    a.  What are the considerations during analysis? | Peer | Peers' Observations<br>Interviews with peers | Qualitative | Content Analysis |
|    b.  What are the considerations during design and development?<br>   c.  What are the enablers of the use of blended learning environment during implementation? | Documents | Forum transcripts<br>E-mails<br>Syllabus | Qualitative | Content Analysis |
|    d.  What are the barriers to the use of blended learning environment during implementation? | Students | Interviews with students (for two groups: before and after pilot study) | Qualitative | Content Analysis |
| 2. What are the students' experiences on the enablers of and barriers to learning in a blended learning environment? | Students | Student Perceptions Questionnaire | Quantitative + Qualitative | Descriptive Analysis + Content Analysis |
|    a.  What are the students' perceptions of the enablers of learning in a blended learning environment? | Students | Students' weekly reflections | Quantitative + Qualitative | Descriptive Analysis + Content Analysis |
|    b.  What are the students' perceptions of the barriers learning in a blended learning approach?<br>   c.  What are perceptions of students on the | Students | Interviews with students (after actual implementation) | Qualitative | Content Analysis |
| necessary conditions for blended learning environments? | Students | Forum, E-mail, & Website use logs | Qualitative | Content Analysis |
|  | Students | Student Profile Questionnaire | Quantitative | Descriptive Analysis |
| 3. What are the critical issues to the use of a blended learning environment? | Overall | Overall | Overall | Overall |

# CHAPTER 4

# RESULTS

This chapter presents the findings of the study concerning the research questions stated formerly. The findings were categorized into three main themes for the ease of reading: considerations before implementation, results of the implementation, and lastly critical elements for designing blended learning environments. A summary is provided at the end of the chapter.

In the first theme, the instructor experiences during the analysis, design, and development processes are provided within three sections: considerations on needs analysis, considerations on refinement of needs, and considerations on design and development. Since this part included the results before the implementation period, it is entitled as "considerations before implementation". In the second theme, the experiences of instructor and students in the implementation process regarding the enablers and barriers are given. Within this theme, initially basic information of the students and peers who were critical data sources of this part are provided. Finally, the findings related to the critical factors for designing blended learning environments which were derived from the first and second theme are presented as the final theme. Figure 4.1 illustrates the main themes and the related results within a descriptive model to demonstrate the results of the study in respect to data collection processes and result interactions.
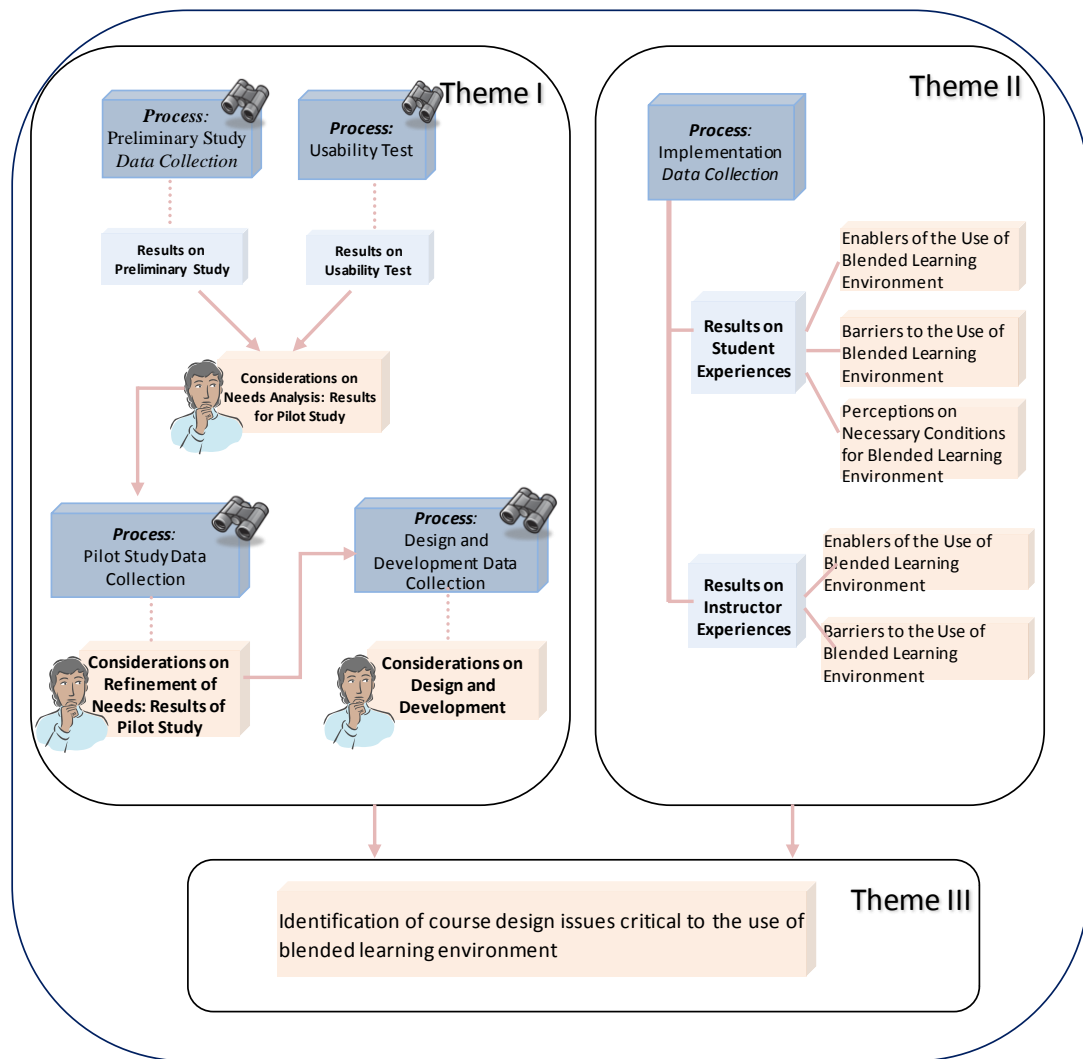
Figure 4.1 Descriptive Model of Research Results

## 4.1 Theme I: Considerations before Implementation

This first theme comprises the analysis, design, and development processes of the course design before the implementation of the blended learning environment. The analysis period consisted of the processes before and after the pilot study in two parts: needs analysis and refinements of needs. Considerations on needs analysis were emerged with the results of the preliminary study and usability test (Figure 4.1). These considerations were taken as a basis for the pilot study design. After the pilot study, the results yielded

new considerations on the refinement of needs which was soon served for the considerations of the revision of the course design and development period.

### 4.1.1 Considerations on Needs Analysis: Results before Pilot Study

The needs analysis period was twofold: the preliminary study and usability study. The main considerations for analysis, design, and development are presented together with the results of these two studies.

### 4.1.1.1 Preliminary Study Results

The preliminary study results revealed the needs and requirements of the traditional delivery of the learning environment. The data sources for this period consisted of interviews conducted with five students and one instructor who were the participants of CEIT 209 course in traditional delivery. Additionally, instructor insights were included in this section. The results of the preliminary study revealed important considerations for course design of the pilot course. The main themes emerged from the analyses included pedagogical approach, course organization, motivation, interaction, instructor role, student role, and suggestions (See Appendix J for detailed results).

Regarding the pedagogical approach, the results showed that the major approach for the classroom instruction was instructor-centered which was necessary in delivering the fundamental knowledge and skill development. The student-centered approach was also used in activities, which was engaging but inadequate. Students needed active and engaging activities for course design. Team approach was used in discussions, but lacked involving all. Finally, active student participation and involvement was not possible for all students due to class size. Taking these into consideration, the F2F environment was designed again in the form of lectures in which the instructor would present the content, invite experts to discuss their experiences in relevance with the course content, and engage students in group discussions, presentations, etc to make them active in the course. For the online environment, the instructor aimed to incorporate the following considerations of active learning principles for online environments as Levin, Waddoups, Levin, and Buell (2001) proposed:

1. *Rich student-student interactions* through discussions in forums, and instant messaging environment and group work assignments,

2. *Adequate and timely feedback from instructors* through messages in forums,

3. *Relevant and challenging assignments* with guidelines and relevant resource links,

4. *Flexibility in teaching and learning,* by allowing individual pace in the completion of any given assignment,

5. *Coordinated learning environments* by scheduling tasks at the beginning of the term.

In addition to these, she aimed to encourage *collaboration* through group works; and *self-pacing* through individual use of the site in anytime- anywhere.

For the course organization, the instructor aimed to have the similar organization for the F2F environment but balance them with online components including course materials and resources, assignments, and announcements. Discussions were important parts of the course and therefore she aimed to incorporate forum and chat environments as well. Regarding the interaction being mainly positive but limited, the instructor aimed to strengthen with the online availabilities. She aimed to provide more interaction via online forum discussions, chat, and e-mail environments. Finally, for the instructor and student roles, the instructor aimed to make them more active. She aimed to move from instructor-centered to more student-centered environment by taking the facilitator role where students are engaged in more discussions and have more responsibility in project work. The suggestions of the previous course instructor and students allowed the instructor concentrate on matching project work, content and resource allocation, instructor and TA support, and online activities between online and F2F portions of the course. The summary of the findings of the preliminary study with the considerations for the pilot design is given in Table 4.1.

**Table 4.1** Summary of the Findings on Preliminary Study

| Dimension | Findings | Considerations for Pilot Design |
|---|---|---|
| Pedagogical approach | - Main Approaches:<br>  o Student-centered approach for course activities: engaging<br>  o Instructor-centered approach in delivering fundamental information: required<br>  o Team approach in discussions: satisfactory but lacks<br>  o Active student participation and involvement: limited in course<br>  o Support and guidance: good but limited for all<br>- Motivation:<br><br>*Positive motives:*      *Negative motives:*<br>  o Instructor encouragement    o Instructor-centered<br>  o Project preparation in groups    instruction<br>  ▪ Have new friends      o Hard to ask instructor<br>  o Expert seminars       questions on course<br>  o Team discussions | - Include instructor-centered approach for basic info delivery (F2F)<br>- More student-centered approach for active learning (online)<br>o *Rich student-student interactions* via forum discussions and chat environment and group work assignments,<br>o *Adequate and timely feedback from instructors* through messages in forums and e-mails<br>o *Relevant and challenging assignments* including guidelines and relevant resource links,<br>o *Flexibility in teaching and learning,* through allowing individual pace,<br>o *Coordinated learning environments* by scheduling tasks at the beginning of the term and using announcements online. |
| Course organization | - Activity design<br>  o Demonstration of examples: lack digital sources to discuss<br>  o Expert seminars on related topics: encouraging and motivating<br>  o Book reviews, software evaluations, terminology activities: satisfactory but lacks sharing to all<br>  o Practical activities of groups projects and presentations: heterogeneous grouping, motivating and satisfactory | - F2F components:    - Online components:<br>  o Lectures for content    o Course materials<br>  presentation      o Assignments<br>  o Expert seminars    o Announcements<br>  o Student discussions in    o Forum<br>  groups      o Instant<br>  o Student presentations    messaging |

**Table 4.1** Summary of the Findings on Preliminary Study (cont'd)

| Dimension | Findings | Considerations for Pilot Design |
|---|---|---|
| Interaction | - Between student-instructor: positive but lacks logistics like announcements, assignments<br>- Between student-student:<br>  o Within groups: positive but limited<br>  o Among groups: very few or no interaction<br>- Between student-content: very limited<br>- Between student-TA: very limited | - More interaction via<br>  o online forum discussions<br>  o chat<br>  o e-mail |
| Instructor role | - Authoritative: satisfactory<br>- Lacks online environment for tracking student progress and particularly providing students with online resources | - Authoritative<br>- Facilitator of online environment |
| Student role | - Both active and passive roles (due to)<br>  o Engaging tasks and projects for individual and team contributions<br>  o Having difficulty in expressing ideas in-class | - More active in project work<br>- More active in discussions<br>- More reflective in assignments and discussions |
| Suggestions | - More group works<br>- More technical content<br>- Deliver online resources<br>- Include online discussions, chat<br>- Online announcements, assignments, tests<br>- Full time online interaction<br>- Assistant/expert involvement online | - Project discussions continue online<br>- Online resources for content of the course including examples<br>- TA and expert involvement online<br>- Instructor support online<br>- Online announcements |

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**4.1.1.2 Usability Test Results**

Usability test period included a user test and expert analysis. Once user test has been conducted, they were analyzed in an iterative process to reveal what needed refinement and change. After user tests, three experts evaluated the web site according to Nielsen's Heuristics. The results are presented in Appendix K.

Both user test and expert reviews provided data for the usability of the Web site. The findings supported each other: what users suffered could be explained by expert reviews. It is important to note here that the instructor focused on the findings related to the problems of the Web site only, since, the site were improved with these results. The results in these findings regarding the needs analysis period are discussed in the following list:

- The experts mentioned about the mismatch of titles and related links, which caused invisibility of the system status for the users. The structure was clear and easy for users to follow what is going on, but the mismatch of titles and links may cause problems as the experts stressed. Another thing was about instant messaging. The experts emphasized that after clicking the icon, chat was not initiated. The users experienced this problem as well. Invisibility problem was tried to be avoided by relating the names of headings and links, and starting chat when the page is loaded.

- The experts stated inconsistencies in colors, words, graphics, and placements. The navigation problem of users for finding the required information could be explained by those inconsistencies, since what they guessed for the information placement was not where they looked. These inconsistencies in link titles, their font styles, background coloring in right frame, and wording for certain operations (page closing, changing password, changing the name of icon "online user" to "online users" icon) were avoided.

- The experts pointed out problems regarding error prevention in changing password, and tab key function in instant messaging. During related tasks, the users faced with problems as well. The problems was tried to be avoided by removing ID submission demand for password changes and starting chat immediately after opening the page.

- When the experts reviewed the site about users' memory load, they stated that some actions and options were not made visible for users. When a menu item was clicked on the left, information was presented in the right frame, but nothing happened in

the item. This was a problem for users as well. While some users searched for information, they clicked the same link they had already opened. This problem was tried to be avoided with color-font emphasis in the link items.

- The experts stated that there was information not needed in some links (i.e "in … format", "click here"). The researcher could not observe this problem directly in user test, but this problem was tried to be avoided by giving direct hyperlinks on the link item.

- Both the experts and the users suggested minimizing the buttons serving for same purposes. These buttons were FAQ menu item and Help button. The experts also pointed out insufficient amount of information about help and documentation. Users also tried to find help documents for certain tasks, but they could not find the information in help button. The experts stated help was designed only about chat and password, but that it would be better to include all the relevant links and documents of the site. The functions of FAQ and help tried to be changed to technical issues of the site in FAQ and course content in Help buttons.

In sum, the results of usability tests with expert checks directed instructor to improve the design of the online environment to get over from the mismatch of titles and related links; inconsistencies in colors, words, graphics, and placements; problems regarding error prevention in changing password, and tab key function in instant messaging; hyperlinks problems; and insufficient amount of information about help and documentation. The design of the online environment was improved with these results.

### 4.1.2 Considerations on Refinement of Needs: Results of Pilot Study

The data sources for the analysis of the refinement of needs period consisted of instructor diaries, student interviews, and course documents like forum scripts and messages, student reports on project development (including instructor feedback written on papers), student evaluations of their own projects and the process that they experienced, and attendance sheet of F2F sessions. These data sources helped the instructor frame the needs for the revision of the course in blended format (Temur Gedik, Kiraz, & Ozden, 2006a). A summary of the findings are given in Table 4.2.

**Table 4.2** Summary of the Pilot Study Findings

| Perspectives of; | Findings on Issues for Revision | Considerations for Actual Design |
|---|---|---|
| Students | Classroom size | Develop strategies for large classroom size. Involve students more. |
| | Technical issues | Solve access problems to online environment. Inform students of the features of the online environment at the very beginning of the semester. |
| | F2F and online discussion matches | Match online discussion topics with the F2F discussions. |
| | Workload | Decrease the amount of activities and assignments. |
| | Guidance on project | Find better strategies to have more guidance on projects. (e.g., show previous year examples, discuss together) |
| | Amount of online resources | Increase the number of resources and links. Record F2F sessions and upload to online, use chat environment, involve experts more in the learning environment as well as invite more experts. |
| Instructor | Presentation and reflection for projects | Engage students more on reflecting what they have done in project as they progressed. (such as presentations, report writings) |
| | Online discussion issues | Decrease the crowd of students by grouping them. Link the forum discussions to real life contexts. |
| | Team assignments and presentations | Equally share workload for each student in groups. Develop strategies to assess who contributed to what part in groups. |
| | Project support for real life | Involve teachers in K-12 schools to help students in their project processes of problem identification and development of solutions. |
| | Online videos of F2F sessions | Embed F2F recordings to the online environment so that students can go back and revise the content of the course when necessary. |
| Both (based on other documents) | Harmony of F2F and online | Use a general pedagogical framework which support and balance design and implementation between the F2F online portions of the course. Deal and pursue the harmony of two environments as well as dealing with their features within their own contexts. |

The analysis of the data revealed several issues to improve in the eyes of students and course instructor (See Appendix L for extensive results). The major themes from student perspectives included classroom size, technical issues, F2F and online discussion matches, workload, guidance on project, and the amount of online resources. The themes from instructor perspective were presentation and reflection for projects, online discussion issues, team assignments and presentations, project support for real life, and online videos of F2F sessions.

All students mentioned that the classroom was crowded. This was an issue that cannot be resolved but needed strategies to minimize problems. The technical problems were related to access to online environment. This was a lesson learnt that students needed to be informed of the features of the online environment at the very beginning of the semester. Students also complained about the increased workload. This finding directed the instructor to decrease the amount of activities and assignments. Another issue remarked by interviewees was inadequate guidance on project. This consideration led the instructor to find better strategies to have more guidance on projects. The last concern that the students mentioned was the amount of online resources to be very few. With this result, the instructor aimed to increase the number of resources and links. For the other suggestions made, the instructor aimed to record F2F sessions and upload to online, use chat environment, involve experts more in the learning environment as well as invite more experts.

From the instructor perspective, the issues that need to be revised were related to presentation and reflection for projects, online discussion issues, team assignments and presentations, project support for real life, and online videos of F2F sessions. She was concerned on engaging students more on reflecting what they have done in project as they progressed. Another issue was online discussions on two concerns: one for the crowd of students in each topic and other was content of the discussions being poor. She felt it would be better to link the forum discussions to real life contexts. Regarding the team assignments and presentations, the instructor believed that all workload was not shared equally within groups and it was hard to see who contributed to what part since they were not very fair in their final reports on workload to help their friends. Regarding the project support for real life, the instructor became aware of the need to involve teachers in K-12 schools to help students in their project processes of problem identification and

development of solutions. This was a suggestion made in a conference presentation where the instructor shared some findings of the pilot study (Temur Gedik, Kiraz, & Ozden, 2006b). Finally, the instructor also found it a need to embed F2F recordings of the course session to the online environment so that students could go back and revise the content of the course when necessary. Although she uploaded ppt documents to online, she found it a better strategy to upload the video recordings online.

Finally, after the pilot study, the instructor came to a conclusion that being an instructor in blended environment needed to deal and pursue the harmony of two environments as well as dealing with their features within their own contexts. This pushed her to determine a general pedagogical framework which would support and balance her design between the two delivery environments. The results of the instructor notes revealed that instructor's initial concern before the implementation period was to conceptualize what the course content required, what the students characteristics were (e.g., proficiency of technical skills, background knowledge etc), and what availabilities she had in the context of the department (e.g., technical availabilities on online system, management of the online environment etc). In her notes she wrote (August 14):

> …The last year's experience with the course has helped me to be aware of the context from both participants' and content sides. My initial concern is about the course content. I tried to remember the subject matter from all perspectives, therefore I revised my materials, readings, books, assignments, etc. that I used last year. Following to this, I tried to determine the characteristics of the students, the study environments (both online and F2F) once again. After that, I revised my course objectives. This provided me with the outline of the course for the semester. Next step for me is the identification of instructional strategies. I need to create a balance though! ...

These issues are intertwined with the design and development considerations and explained in detail in the following section.

### 4.1.3 Considerations on Design and Development

The data for the design and development period of the course design consisted of instructor diaries and notes as well as findings of analysis results. The data analysis results showed that the design and development considerations were centered on pedagogical approach, course materials and documents, course organization, interaction, and student and instructor roles.

**4.1.3.1 Initial Considerations**

Parallel to analysis considerations in pedagogical needs for creating a balance between online and F2F environments, the instructor tried to match online activities with F2F ones and focused on the scheduling of tasks within weeks. At this point, her pedagogical framework seemed to be critical to her decisions. She explained the use of activities and its reasons as the following example on August 14: "I want my students be very active throughout all semester as it is the core of my pedagogical concern..."

In the activities design, she tried to consider the features of content and context. She conducted online search for this concern. In her notes she wrote:

> … The content of the course requires both knowledge and skills development. While there will be direct instruction and presentation methods be employed, the main instructional approach is considered to be active learning through first principles of instruction taking adult learning and authentic teaching principles into consideration as well…

On September 21, she took the following note in her diary about online discussions:

> … Other thing that I am trying to complete is the determination of online discussion topics. It is really hard to determine these for each week. I think in the following weeks, after getting acquainted with the students and the course, my thoughts will be clearer. Therefore, I will just try to determine the scope of the discussions, but not the exact topics.

After the identification of course objectives and pedagogical approach, the instructor identified the instructional strategies and assessment issues. The analysis of instructor notes showed that she identified the instructional strategies and outline of the activities different for F2F and online environments while she designed the assessment as a whole for the two environments.

**4.1.3.2 Considerations on Pedagogical Approach:**

After the pilot study, the instructor needed to integrate a design framework that would help her frame the pedagogical concern not only for F2F or online environment, but with the harmony of both. For this need, she decided to make use of Merrill's First Principles of Instruction which seemed appropriate for a learner-centered and authentic learning environment. She made use of authentic activities in the design of course activities which

were appropriate to general course context and goals. In her notes on August 14, she wrote:

> … I want my students be very active throughout all semester as this is the core of my pedagogical concern. Therefore my strategies should match in online and F2F environments to fulfill this aim. Since this is the core of my pedagogical approach, I will apply the first principles that I believe fits the needs of the course content within this context… I can use authentic tasks for my activities. …

In her notes in which she reflected her initial considerations for the design and development of the course, she wrote how she identified the course objectives, instructional strategies, course outline, interaction and collaboration, and course assessment. For the ease of reading, these considerations will be described related to the principles of problem, activation, demonstration, application, and integration. A summary of the design and development considerations is given in Table 4.3 for each principle with the related authentic activity characteristics (Reeves, Herrington, & Oliver, 2002) and related pilot study results.

**Table 4.3** Summary of Pedagogical Considerations in the Redesign of the Blended Course

| Merrill's Principles of Instruction | Related Pilot Study Results | Considerations in Design and Development | Authenticity of Tasks (Reeves et al., 2002a) |
|---|---|---|---|
| Problem | - Include group presentations and reports for project development<br>- Introduce what other students in previous years had done or what examples can be offered for what was expected of students<br>- Discuss on sample instructional materials<br>- Include the discussions in forum environment within groups<br>- Summarize each discussion | - Project development<br>  ▪ online project discussions teams<br>  ▪ project teams' F2F (showcases) in the middle of development process<br>  ▪ engaging students to go to K-12 school for subject matter experts over time<br>- Discussion on sample instructional material<br>- Discussions within groups<br>- Introduction of example projects | - have real-world relevance & ill-defined<br>- provide opportunity to collaborate<br>- provide opportunity to reflect and involve beliefs and values<br>- be integrated accross different subject areas<br>- provide opportunity to examine tasks from different perspectives, using a variety of resources |
| Activation | - Have online materials and presentations available<br>- Have more expert seminars | - Inclusion of engaging presentations in F2F<br>  o Online availability<br>- Online scenario based discussions<br>  o Summaries done by students<br>- Expert seminars<br>- F2F Quizzes and discussions afterwards | - provide opportunities to examine tasks from different perspectives<br>- have real-world relevance<br>- provide opportunity to reflect and involve beliefs and values<br>- be integrated with assessment |
| Demonstration | - Include more links and e-sources on the content<br>- Show sample projects from various companies in the F2F hours | - Discussion on sample projects<br>- Inclusion of a variety of links, e-sources<br>  o Assignments on reflecting on sources<br>- Expert seminars | - provide opportunity to reflect and involve beliefs and values<br>- provide opp. to examine tasks from different perspectives |
| Application | - Engage students in presentations where they present projects' initial formats and final showcases.<br>- Involve teachers from K-12 schools | - Project development<br>  o teams' F2F showcases in development process and in the final<br>  o directing students to K-12 schools | - have real-world relevance<br>- provide opportunity to reflect and involve beliefs and values<br>- provide opportunity to collaborate |
| Integration | - Take turns in team assignments<br>- Integrate with real life<br>- Reflect more | - Reporting the progress of the projects<br>- Reporting on and presenting findings on CAI material evaluation<br>- Take turns in presentations<br>- Use of project materials in schools | - provide opportunity to reflect and involve beliefs and values<br>- yield polished products valuable to their own right<br>- allow competing solutions |

*Principle 1: Problem-Based:* Regarding this principle, the instructor designed a project assignment in which students were supposed to create an instructional project with authentic tasks to be completed with a teaming approach (Temur Gedik, Kiraz, & Ozden, 2006b). The pilot study showed that students needed an online environment where they can discuss and share their team efforts. To meet this need, students were provided an online forum space where they could discuss about their team projects. They were also responsible to work on design problems for sample instructional multimedia, discuss scenarios on sample course content in the online environment, and discuss sample problems or issues in F2F lectures. That is, the course design embedded authentic real-world problems and tasks and helped students to learn the components of the tasks and use in solving a problem, which is in this course to develop a CAI material that would meet the needs of an instructional problem. Pilot study results also showed that students needed to see the relevance of what they designed as a CAI material, and it was suggested to ask K-12 teachers for identifying their instructional problems in a real curriculum and school environment. Therefore, students were directed to K-12 schools throughout their project development process to work with teachers on their progresses.

*Principle 2: Activation:* For this principle, the instructor designed PowerPoint presentations where she aimed to activate students' prior knowledge via questions and remarkable information on the content of the course. In addition to these presentations, she held F2F group based discussions where students discussed sample content issues within groups. They were also engaged in online discussions on sample scenarios about the issues. Experts from different companies and academia were invited to the F2F course to share their experiences with the tasks and actions they were engaged so that students can see the relevance of the new knowledge and recall the newly introduced topic. The instructor also created an online post on forum for students to reflect on their perceptions about how they feel and think about these expert seminars which would activate and create a shared atmosphere among students. Other than these, the instructor created quiz questions on the previous week's topic related to the particular lesson content for activating their prior knowledge and motivate for the new session. A discussion was held after each quiz to link the new content to the previous.

*Principle 3: Demonstration:* For helping students to be guided on learning the new knowledge, the instructor decided to use the benefits of online environment mostly. She

provided students with many example links and e-sources on the content and gave assignments on reflecting about these sources. She also gathered sample projects from various companies to demonstrate in the F2F hours. During the demonstrations, the instructor aimed to challenge students to reflect on the problematic issues, or important concerns they need to find out on these materials for the aim of relating the new information to previously learned one.

*Principle 4: Application:* In the design of the course, the instructor enhanced feedback to students not only from herself with instructor role, but also from other students as peers, and from course assistants and other TAs in the department via initial presentations in the middle of the project period. Students were encouraged to contact K-12 teachers for the problem space of their projects and develop a CAI material for their classes. It was an opportunity to apply the programming skills that they had already known to create an instructional material with the principles learnt in CEIT 209 course.

*Principle 5: Integration:* Students were planned to report on what they were doing during project development, which would support them to integrate what they gained in course with the project practice. Another approach was to ask students to reflect on sample CAI projects and present their ideas as a group in the class. Each student was supposed to take their turns to present their findings so that each individual student can voice their individual ideas. Most assignments were done in groups since these kinds of projects are always completed with a team effort in the real life. Moreover, the students were planned to use their projects in schools as real life applications and assess their projects as a summative evaluation.

**Characteristics of Authentic Activities:**

Regarding the major characteristics of authentic tasks and activities that were defined by Reeves et al (2002), the instructor developed strategies to meet the requirements of these characteristics. As presented in summary form in Table 4.3, the design and development considerations based on pedagogical framework embedded these features as the following:

*Authentic activities have real-world relevance:* The instructor aimed to assign students a project in which they were supposed to create a CAI material following the ADDIE model within groups. By directing students to K-12 teachers for the project's phases to get help from the teachers as subject matter experts, it was planned to increase the real-world

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relevance of the activity. Other than this, the instructor designed online scenario-based discussions that imitate real life incidents on the scope of the course content. Including more expert seminars were also planned for the course so that students could see the real world relevance of what they were learning.

***Authentic activities are ill-defined, requiring students to define the tasks and sub-tasks needed to complete the activity:*** The instructor planned almost all activities to be ill-structured in which students could be able to apply multiple solutions to approach the tasks and sub-tasks required for the completion of the assignments. These activities included the project, the CD evaluations, and weekly assignments as well as online scenario topics.

***Authentic activities comprise complex tasks to be investigated by students over a sustained period of time:*** The project was scheduled to initiate at the midst of the semester until the ends of the final exams so that students could be able to work on an extended time period parallel to the information gained in class sessions.

***Authentic activities provide the opportunity for students to examine the task from different perspectives, using a variety of resource:*** The course design embedded variety of resources developed for both online and F2F environments including links and e-resources (for online), and materials involving readings, activity handouts, quiz papers, and evaluation papers for presentations and project works (for F2F). The instructor also gathered example projects to demonstrate to students in class and developed appealing presentations.

***Authentic activities provide the opportunity to collaborate:*** Collaboration among students was planned in the project assignment and related tasks including presentations and discussions. The inclusion of K-12 schools to their projects was another strategy to increase the student collaboration. The project assignment and CAI material evaluation assignments were designed to be completed by student groups so that they could have more opportunity to collaborate.

***Authentic activities provide the opportunity to reflect:*** Parallel to pilot study results, more reflective activities were included into course design. They included presentations of students of projects both at the development stage and the final stage, the presentations on the CAI material evaluations, the F2F discussions on content presented, the online

discussions on scenarios and on projects. They were also supported to reflect their personal beliefs or comments and recommendations in a place developed in online forum environment.

***Authentic activities can be integrated and applied across different subject areas and lead beyond domain-specific outcomes:*** Due to the nature of the course content, different subject areas were part of the content (i.e., technology, educational science, psychology). To enhance more interaction with different subjects, the decision of the subject of the CAI projects were left to students.

***Authentic activities are seamlessly integrated with assessment:*** Student assessments were planned to be done based on student participation and completion of tasks via quizzes, discussions, question-answer sessions, presentations, and weekly assignments in F2F environment. The online assessment procedures were again based on participation to the discussions (quality and quantity) and use of the site (logs).

***Authentic activities create polished products valuable in their own right rather than as preparation for something else:*** Instructor developed guidelines for each phase of the project. At the end of the project students would be a CAI material that can be used for instructional purposes.

***Authentic activities allow competing solutions and diversity of outcome:*** The activity guidelines were designed to support students' diverse solutions and approaches to solve the inherent problems.

### 4.1.3.3 Considerations on Course Materials and Documents

The analysis of instructor data revealed several considerations regarding course materials and documents. The major themes were centered on considerations on F2F and online material gathering, online document upload and organization, and preparations of ppt documents.

The pilot semester was very helpful in terms of gathering course materials and documents and identifying the needs. After the pilot semester, the instructor revised the documents and tried to improve them related to needs. In her notes on September 10, which was two weeks ahead of semester, she wrote:

… I am trying to gather all the books and Internet resources including up-to-date information of the content of the course. I identified new resources to improve my ppt slides and my electronic sources…

… Last semester showed me that I needed to include many more links and examples online. This necessitates making an extended online search and hopefully I will end them all this week….

The second consideration was uploading and organizing the documents in online environment. This was an important task for her to organize the amount of information covered in F2F sessions, and online environment and to balance the two environments. She wrote (September 21):

… This week I uploaded many of documents to online environment. Only a few are left (Links and online documents: I need to revise once again in terms of content). The videos will be uploaded after in-class sessions…

Afterwards, she tried to complete the revision of presentations and make ready for the online environment (September, 23):

… I am working on the revisions of ppt slides since they need improvement not only in terms of references to be used but also in content so that parts of content can be covered not only in F2F but online...

### 4.1.3.4 Considerations on Course Organization

In the design of the blend of the online and FTF components of the course, instructor's basic consideration was to balance them. Therefore, she tried to design the portions to be equal. She wrote on her notes that she had difficulty in balancing them all. She reflected (August 14):

… It is really hard to balance the course activities in F2F and online environments. I don't exactly know how to set an agenda for where each activity would fit. So, it is time arranging them all appropriate to my pedagogical concern…

With the results of the pedagogical considerations as well as the analysis results, the components of the blended setting in the course included the followings (Table 4.4):

1. 2-3 hours of FTF lectures,
2. FTF expert seminars in classroom hours,
3. Online resources in course website including reading materials, sample links, and related documents,

4. Online forum for discussions.

**Table 4.4** Components of the Blended Setting

| Proportions | Components |
|---|---|
| Online Components | Reading materials, resources |
| | Forum discussions |
| | Sample links |
| | |
| FTF Components | Traditional lectures |
| | Group Works (cooperative learning groups) |
| | Group discussions |
| | Expert seminars |

Due to the theoretical nature of the course content, the instructor organized the content for F2F environment where she would introduce the content first using elaboration and group discussions and then students can have chance to work more on content and examples, and reflect on them in the online environment individually and within groups. Therefore, the sequence was F2F first then comes online, although the portions were designed to be equal. She aimed to increase the number of online discussions as well.

In order to decrease the potential technical challenges that students face in the online environment, another consideration was to design an orientation session at the beginning of the semester. She aimed to introduce students the login system, the features of online course materials and tools and introduce the rules for forum postings F2F to establish a common ground on rules. She wrote (September 23):

> … I finished writing the rules for writing in forum discussions. I can revise them in the orientation session with students to have a mutual agreement on the rules. But I know for sure that they need to be reminded of them…

### 4.1.3.5 Considerations on Interaction

The different types of interaction were matter of concern in instructor's design and development considerations. Regarding the student-student interaction, the instructor's major concern was to create maximum opportunity to help students learn from each other. In order to achieve this aim, she planned increasing the activities in groups in F2F environment and increased her attention on group project assignment which could be supported in online as well. She wrote:

> … I will engage students into group tasks that they will discuss and perform the task that I will assign them. These activities will be on the course topic, either to make them be interested in the topics, or summarizing, or synthesizing the presented topic… (August 16)

> … Student online discussions will help them interact with each other after the F2F session ends on course content. When projects begin, I will create a thread in forum for each group so that they can continue their interaction online 7/24. I need to learn how to technically create a thread for each group and prevent other groups to access it… (September 21)

For the instructor-student interaction, the instructor's consideration was similar for both online and F2F environments. In F2F sessions, students could interact with instructor since the courses were designed suitable for both instructors and students to interact. In online sessions, instructor aim was to design discussions where students could interact and she can contribute where necessary. This means, her interaction with students was less than F2F sessions.

Regarding the student-content interaction, the consideration was how students could interact with the online environment as a whole. The resources, links, assignments, and other documents were all designed and developed by the instructor. The students could use the materials with their own pace. However, chat and forum environments were the only places in which students could actively interact with the content. In order to increase their interaction, instructor aimed to design forum topics in a format that they could participate actively.

The last interaction type was expert-student interaction in the course. The instructor aimed to create an interactive environment in which students could interact with experts on the content of the course and increase the opportunities for students to learn from practitioners

and experts on the fields. For this aim, she aimed to design expert seminars in F2F courses, and continue interaction online. She wrote:

> … Expert involvement helps students a lot. I need to schedule expert seminars F2F and ask them to participate online discussions to provide feedback to students online if possible… (August 30)

### 4.1.3.6 Considerations on Instructor and Student Role

The data analysis on instructor notes for the design and development of the course revealed that her main concern for the student role was making them active participants. Her main pedagogical approach was based on this role and she tried to design activities and learning environment appropriate to this aim. On August 14, she wrote: "I want my students be very active throughout all semester… this is the core of my pedagogical approach…"

In her notes on the activities design, the instructor wrote the following bullets that included her concerns on student and instructor role:

> … I plan to use the following strategies:
>
> - Using direct instruction and presentation methods in class sessions…
> - Employing group discussions and cooperative learning tasks in class...
> - Assigning homework in which they can make searches on the given information…
> - Engaging them [students] into discussions in online environments. My initial strategy for this will be dividing the whole class into 5-6 main groups to make discussions in separate divisions, and assigning one student from each division to summarize the discussions each week…
> - Providing online links to useful sites, online useful documents, and course videos for remediation…
> - Creating forum threads and subjects and moderating them. I will be facilitating the posts and will respond like a student, but let mostly students to respond…
> - Not sure of chat use..
> - Arrange expert seminars and online participation…

Regarding these strategies, it is evident that instructor aimed to have a facilitator role in facilitating discussions, arranging course activities, coordinating group works, etc. However, she has a dominant role in information presentation. The students had both active and passive roles although instructor stated her aim to make them active. The activities show that students would be active in group works, online and F2F discussions

or project development processes, but it can be asserted that they would be mostly passive in information gathering processes in F2F and online environments.

## 4.2 Theme II: Results on the Implementation

The data in the implementation period was collected from instructor, peers, and students (see Table 3.5 for data sources). Therefore, initially basic and demographic information of the participants will be presented. The instructor was the researcher of this study and information of instructor was already presented in methods chapter (Chapter 3). The information of the instructor experiences in the implementation period was gathered from the instructor diaries, observation notes of the peers, and the results of the interviews with peers. The information of the student experiences was gathered from students' weekly reflection papers, interviews, student perception questionnaire and student profile questionnaire, and forum transcripts as well as documents on Website logs and e-mails.

### 4.2.1 Basic and Demographic Information of Participants

The participants were asked descriptive information about their genders, school of graduation, home computer ownership, Internet access, use of course website, and access point to course website through the questionnaire.

### 4.2.1.1 Basic Information of the Students

As it is shown in Table 4.5, 67.5% of the students were male and 32.5% were female. 70% of the students were graduated from a vocational school with a computer/electronic curricula. 97.5% of the students have computers at home, and 82.1% of them have Internet access. 2.5% of the students did not own a computer.

**Table 4.5** Basic and Demographic Information of Students

| Gender | F | % |
|---|---|---|
| Male | 27 | 67.5 |
| Female | 13 | 32.5 |
| **Graduation from Vocational School** | **F** | **%** |
| No | 12 | 30 |
| Yes | 28 | 70 |
| **Own Home Computer** | **F** | **%** |
| No | 1 | 2.5 |
| Yes | 39 | 97.5 |
| With Internet Access | 32 | 82.1 |
| Without Internet Access | 7 | 17.9 |

The students were also asked the number of blended courses taken before in order to reveal their previous participation in a blended environment (see Table 4.6). The results show that all students had at least one blended course experience (except for one). Half of the students (52.5%) had 2 blended course experiences. Considering CEIT 209 course as a second year course, the results show that even when they are freshmen, students had experience in courses where online environments were integrated to their F2F courses. The 22.5% of students had one blended course, while another 22.5% students had three or more blended courses before taking this course.

**Table 4.6** Blended Courses Taken before the Course

|  |  | Not at all | 1 | 2 | 3 or more |
|---|---|---|---|---|---|
| Number of blended | f (%) | 2.5 | 22.5 | 52.5 | 22.5 |
| courses taken so far | N | 1 | 9 | 21 | 9 |

Students were asked their access points for the course website to understand if they had easy access to course website (see Table 4.7). They were asked to rate the places that they preferred to use for Website. Most students ranked their home computers at the first place (n=28). Department labs (n=21) and dormitory labs (n=21) were coming next. These places were the common access points which can indicate that students could have the physical opportunities to access to online system.

**Table 4.7** Access points for Course Website

| Access Points | Preference Order | | | |
| --- | --- | --- | --- | --- |
| | Never | 1st | 2nd | 3rd |
| Home Computer | 5 | 28 | 5 | 2 |
| Dormitory Computer Lab | 10 | 2 | 7 | 21 |
| Department Computer Lab | 4 | 8 | 21 | 7 |
| Other | 34 | 1 | 3 | 2 |

Students that took part in the interviews at the end of the implementation period are given in Table 4.8. Their ages ranged 20 to 22 and all of them had at least one previous blended course experience.

**Table 4.8** Basic Information on Students as Participants of Interviews

|  | **Gender** | **Age** | **# of Previous Blended Course Experience** |
|---|---|---|---|
| Student A | Male | 20 | 1 |
| Student B | Male | 22 | 1 |
| Student C | Male | 22 | 1 |
| Student D | Male | 22 | 1 |
| Student E | Female | 21 | 1 |
| Student F | Female | 20 | 1 |
| Student G | Female | 22 | 1 |
| Student H | Female | 21 | 2 |
| Student I | Female | 21 | 2 |
| Student J | Female | 20 | 1 |

### 4.2.1.1.1 Students Preferences on Course Activities

Students have variety of activities and tasks during course period. The student profile questionnaire included questions to ask their perceived comfort level for those activities and tasks at the beginning of the semester. As shown in Table 4.9, students were mostly comfortable for online related activities. The highest mean for their comfort levels were for the items "comfort using online course materials" (M=4.58), "comfort in using course website" (M=4.40), "comfort asking questions to peers online" (M=4.32), and "comfort asking questions to instructor online" (M=4.27). Other items above mean score were "comfort asking peers for help" (M=4.22), "comfort in F2F group work" (M=4.13), and "comfort in online group work" (M=4.11). The lowest mean score was for the item

"comfort in F2F presentation" (M=2.98). Other items below the overall mean score were "comfort asking questions to instructors in class" (M=3.92), "comfort in reading articles on course materials" (M=3.80) and "comfort in preparing assignments/projects" (M=3.80).

**Table 4.9** Student Comfort for Course Activities

| Statements | | Very Uncomfortable | Uncomfortable | Neutral | Comfortable | Very Comfortable | M | SD |
|---|---|---|---|---|---|---|---|---|
| Comfort asking questions to instructor in class | f (%) | 2.5 | 5.0 | 7.5 | 67.5 | 17.5 | 3.92 | .83 |
| | n | 1 | 2 | 3 | 27 | 7 | | |
| Comfort asking questions to instructor online | f (%) | 0 | 2.5 | 10.0 | 45.0 | 42.5 | 4.27 | .75 |
| | n | 0 | 1 | 4 | 18 | 17 | | |
| Comfort asking questions to peers online | f (%) | 0 | 2.5 | 10.0 | 40.0 | 47.5 | 4.32 | .76 |
| | n | 0 | 1 | 4 | 16 | 19 | | |
| Comfort using online course materials | f (%) | 0 | 0 | 0 | 42.5 | 57.5 | 4.58 | .50 |
| | n | 0 | 0 | 0 | 17 | 23 | | |
| Comfort asking peers for help | f (%) | 0 | 0 | 17.5 | 42.5 | 40.0 | 4.22 | .73 |
| | n | 0 | 0 | 7 | 17 | 16 | | |
| Comfort in F2F group work | f (%) | 0 | 2.5 | 10.0 | 60.0 | 27.5 | 4.13 | .69 |
| | n | 0 | 1 | 4 | 24 | 11 | | |
| Comfort in online group work | f (%) | 0 | 2.5 | 17.5 | 42.5 | 32.5 | 4.11 | .80 |
| | n | 0 | 1 | 7 | 17 | 13 | | |
| Comfort in F2F presentation | f (%) | 12.5 | 20.0 | 30.0 | 32.5 | 5.0 | 2.98 | 1.12 |
| | n | 5 | 8 | 12 | 13 | 2 | | |
| Comfort in helping peers in course subject | f (%) | 0 | 0 | 2.5 | 67.5 | 30.0 | 4.27 | .51 |
| | n | 0 | 0 | 1 | 27 | 12 | | |
| Comfort in using course website regularly | f (%) | 0 | 0 | 7.5 | 45.0 | 47.5 | 4.40 | .63 |
| | n | 0 | 0 | 3 | 18 | 19 | | |
| Comfort in reading articles on course materials | f (%) | 2.5 | 2.5 | 25.0 | 52.5 | 17.5 | 3.80 | .85 |
| | n | 1 | 1 | 10 | 21 | 7 | | |
| Comfort in preparing assignments/projects | f (%) | 2.5 | 2.5 | 17.5 | 67.5 | 10.0 | 3.80 | .76 |
| | n | 1 | 1 | 7 | 27 | 4 | | |
| **Overall Mean** | | | | | | | **4.07** | |

**4.2.1.1.2 Student Participation**

Student participation was sought in terms of their perceived participation to the online and F2F portions of the course and the frequency of Website. As indicated in Table 4.10, almost half of the students (47.5%) visited the course Website 3 or 4 times a week. There was only one student indicating no visit to the Website. The second majority of students (35%) visited the Website once or twice a week. There were several students who visited everyday (15%).

**Table 4.10** Frequency of Students' Visit to the Course Website

|  |  | Not at all | 1-2 times a week | 3-4 times a week | Everyday |
|---|---|---|---|---|---|
| Course Website visit | f (%) | 2.5 | 35.0 | 47.5 | 15.0 |
|  | n | 1 | 14 | 19 | 6 |

When students were asked how actively they participated to F2F and online portions of the course, the results revealed that they were more active in online environment (Table 4.11). 32.5% of students were very active in online environment while 17.5% were very active in F2F environment. Majority of students stated that they were sometimes active (62.5% and 67.5% respectively). There were also students who perceived themselves as not actively participating to online environment (5%) and F2F environment (15%) at all.

**Table 4.11** Students' Perceived Participation to Online and F2F Parts of the Course

|  |  | Not Active at all | Sometimes | Very Active |
|---|---|---|---|---|
| Perceived participation to online environment | f (%) | 5.0 | 62.5 | 32.5 |
|  | n | 2 | 25 | 13 |
| Perceived participation to F2F environment | f (%) | 15.0 | 67.5 | 17.5 |
|  | n | 6 | 27 | 7 |

### 4.2.1.2 Basic Information of the Peers

The three peers were graduate students in the same department (two males and one female). Being familiar with blended learning environments, they all observed the classroom environment during different lesson hours and used online environment as guests to explore how students and instructor used the environment. All peers were knowledgeable on instructional design and pedagogical issues regarding online and F2F environments.

Peer A observed the F2F environment several times during semester and had given the course as an instructor in traditional format two years ago. He had blended course experience both as a student and as an instructor. That is, he has taken numerous blended courses and offered several blended courses as an instructor or course assistant. Peer B has also observed the F2F environment several times during semester. He has experience on blended course environments as an instructor or course assistant in previous semesters. He also had experience on using different LMSs for different purposes in courses. Peer C was a participant of the course as the teaching assistant that semester and observed the F2F environment throughout the semester. She did not have any previous experience as a blended course instructor but participated in different blended courses as a graduate student and worked as a teaching assistant (see Table 4.12).

**Table 4.12** Basic Information on Peers

| | Gender | Previous Blended Course Experience (as a student) | Previous Blended Course Experience (as an instructor) | Additional Information |
|---|---|---|---|---|
| Peer A | Male | + | + | - Offered the course in F2F environment before<br>- Knowledgeable on ID and pedagogical issues in Online and F2F environments |
| Peer B | Male | - | + | - Has experience in using different LMSs<br>- Knowledgeable on ID and pedagogical issues in Online and F2F environments |
| Peer C | Female | + | - | - Participated course as the teaching assistant<br>- Knowledgeable on ID and pedagogical issues in Online and F2F environments |

### 4.2.2 Instructor Experiences on the Implementation

Data on instructor experiences on the implementation of the course were gathered from instructor's diary, observation notes of the peers, interviews with peers and also from forum transcripts and documents on Website logs and e-mails.

### 4.2.2.1 Instructor Experiences on the Enablers of Blended Learning Environment

The analysis of data revealed three major categories of the enablers: the unique benefits of online environment, the unique benefits of F2F environment, and the complementary strengths of each environment that constituted the blended course. Enablers of the online environment included saving time for F2F discussions and the functions of the Learning Management System (LMS): the opportunities for up-date information presentation,

access to documents anytime and anywhere, clarity of lesson procedures, presentation of variety of rich sources, and the asynchronous communication and interaction opportunities. On the other hand, enablers of the F2F environment included the opportunities of F2F interaction, adapting lesson with student progress, and F2F guest seminars. Finally, the complementary strengths were arousing student interest and participation potentially more; having flexibility; saving time for certain course activities; more easily tracking student progress; and increased interaction, collaboration and communication opportunities.

<u>Enablers of the Online Environment</u>

The online environment offered the course instructor save time for F2F discussions while allowing rich and easy to track conversations of each student and detailed consideration on the topics. Related to this, the instructor could be able to decrease the student complaints and questions related to the assignments, procedures for any changed schedule, or new readings, etc. Peer A who offered the CEIT 209 course previously declared that

> … The instructor [this semester] diminished the routine complaints of students appeared in F2F classes, could be able to get rid of the problems caused by inadequate interaction and communication of F2F environment. … i.e. when students complained like "I could not have access to that source or reading", instructor said "go ahead and find online"…

One enabler of the online environment related to LMS was supplying up-date information and variety of rich resources, which were regarded critical to the course content. Peer B stated that it would be really hard for the course instructor to provide students with the online resources in the F2F environment and the online resources fit the course content very well. Another enabler was to access and upload course documents anytime and anywhere. On November 28, the course instructor wrote on her notes,

> …it was important for me to align links, documents and a presentation explaining these issues. For this aim, I uploaded documents related with these subjects from a variety of resources. … For the presentation, I planned to use Producer in which I could synchronize the PPT slides with my voice. Of course, this is a one-way instruction, and I had no other choice for explaining the subject in this much short of time. … It helped to solve time-place restrictions for the course content. The students could access that info anytime…

Increased collaboration was a key to the success of the students' projects. These projects were carried out within 4-5 member groups and considering project management and

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teaming issues, collaborative learning was essential. Providing students online areas for project group discussions helped instructor create an opportunity for such collaboration. Peer C described her observation on this issue as:

> … The students made effective use of the forum environment for their project issues. … They learnt how to work together and could do this without a F2F meeting with the use of their online space of group discussion. This was a plus of the course. …

The asynchronous communication and interaction opportunity, maintained by forum discussions and e-mails, helped the instructor involve many students to participate the course actively and see their progress, and coordinate the course accordingly since she found them appealing to the students. The scenario-based discussions were found to be effective by peer B in the forum. On her notes on October 3, the instructor wrote, "There is a friendly climate between the students. They showed interest to what others wrote in forum environment." In one week when she could not have the F2F session, she uploaded a video presentation on the subject to online environment for the students to learn about the content. She later reflected on her notes on November 27 that this rescued her from time-place restriction and she wrote: "The students could access that info anytime. I could present the information about the content which is important for their presentations in the following weeks." Other quotes from peers are as following:

> … Students could follow and gather assignments info, readings, project issues, etc in the online environment. They could discuss their ideas comfortably whenever they wanted without any time limitation. In F2F environment, students or the instructor can be tired, not well concentrated or can have motivation problems. However, online environment –as the main advantage- records these discussions without any time limitation. … Everything is recorded; you can go back and see everything. … (Peer A)

> … I liked the forum environment for this reason: students have a sample scenario on the content to discuss, they discuss issues on expert seminars, and post their questions or problems, it [forum] was like a free communication and interaction area. … In F2F environment, students usually do not participate much, but when it is a written environment, students have the confidence of 'I can write my ideas too' when they see their peers' posts. In a F2F or let's say speech environment, they do not always have the same confidence since things develop just in moment or they may not be aware of the discussion at the moment, but online environment offers time flexibility. … I also loved one more thing in discussions: Students could also discuss about the experts seminars. They expressed their ideas on the contents of expert seminars. … (Peer B)

It is important for students to have instructor feedback. My observations in online environment show that, the students all tried to participate the forum discussions. The instructor gave immediate feedback, both by answering student questions and commenting on their posts. The students also gave immediate responses to their peers. This allows continuity in the discussions. … Even there were student posts saying to instructor: "You have closed the forum this week? But we wanted to write more comments!" Very nice! They really effectively used the environment. … (Peer C)

Enablers of the F2F Environment

Coming to the enablers of the F2F environment, the major finding was allowing an authentic environment with the students via group works on related content. Peer A reflected that "There was a friendly atmosphere in classroom between both student-student and student-instructor". The human aspect of the environment (i.e. eye-contact) has value in that sense. On observation notes on November 28, Peer C wrote: "… Instructor forms a friendly environment in the class, therefore students feel free and relaxed during the lecture, which results in high interaction between students and instructor". The instructor also reflected how she felt in the course on her notes on October 3 as:

They [students] seemed to like working with eachother. Therefore, the session was enjoyable. They were interested to write down their own ideas within group about the topic I assigned. I think we could develop a friendly environment in the class.

It was also easier for instructor to adapt the course according to the students' progress. It can be regarded as a time issue in F2F environment. On December 19, the observer notes included (Peer B):

… Instructor asked important questions to revise if students skip some important characteristics of the program. She tried to ask in-depth questions about the characteristics of the programs in order to highlight missing or misunderstood parts. Students were eager to reply. …

Last but by no means least, guest seminars were really important strategies for the blended course. It helped course instructor to create an authentic environment by enhancing theory with practice and helped to make certain course issues more concrete for students. All of the interviewees mentioned about this opportunity. One interviewee said (Peer A): "One, student motivation is increased. Two, students could see the role models. And finally, they could learn from multiple perspectives". On October 19, the observer (Peer C) noted:

… The guest motivated students via variety of example projects. They were allowed to see multiple perspectives with the games [related topic]. They were encouraged to find more examples with different sites…

<u>The Enablers of the Blended Environment: The Complementary Strengths</u>

The complementary strengths can be regarded as the major enablers of the blended environment. Using online and F2F environments together enabled course instructor arouse student interest and participation potentially more; have flexibility; save time for certain course activities; more easily track student progress; and have increased interaction and communication opportunity.

The data analyses revealed that blended environment helped instructor to attract more attention from students and increased student participation. On November 28, instructor wrote the following note which helped her make more students potentially active:

> … I asked questions about the subject to make them attend the course. ... They seemed interested. But there are still some particular students who are not talking or saying anything from the beginning of the semester. ... In fact, they are more active in online environment. I am happy to see everyone can participate in some way...

> Peer C also reflected her perceptions as the following:

> First of all, the instructor could be able to attract student attention in maximum [thanks to blended learning environment]. It is a major plus that students can contact their instructor both in F2F and online environments. … I think almost all students had a chance to participate the course considering the whole structure of the course. …

Flexibility in moving from one environment to another was another enabler for the instructor. On December 5, the instructor noted that she had problems with time use. She had to direct students to other online resources and documents that she prepared. She was also pleased to manage time and course requirements flexibly in different environments:

> … Time efficiency was a problem for me this week. … Since I could not cover all content, I told students that they could look at the web site and documents I prepared for them online and ask questions anytime. Good to manage things in somehow! ....

In the observation note on December 5, Peer A noted that timing was limited for the guest seminar session and the instructor announced students to post their questions and ideas on

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the forum regarding the content of the seminar. Peer B explained his ideas on this issue in the interview as:

> I found it very positive to have guest sessions and the things after these sessions in this aspect: The invited guests came to F2F sessions and explained things. Discussions were held afterwards but having extended discussion on new ideas on the content or link the issues with the course content in the online environment enabled these discussions made in the written format. That is they could be extended and were recorded. …

Regarding saving time for certain course activities, Peer B pointed out that having discussion portion of the course in the online environment and having theoretical information and related activities to F2F environment helped instructor to save time. He stated the followings on the issue:

> … In F2F course, the instructor already uses the two hours for presenting the theoretical information using examples and making students work in groups and small discussions. In order to discuss more issues on the content, she would have needed extra F2F hours which cannot be convenient for a thirteen-week course. That is, moving these discussions to online environment saves time for the instructor. …. Moving discussions to online environment for such a course enhanced the in-class activities and lecture smoothly and efficiently in terms of time. …

Moving student discussions on content, critical reminders, important news or schedule changes, and expert seminar discussions to online environment again saved time for F2F class. Students could use time in F2F class extensively for F2F discussions and extended seminar durations.

It was also easier for course instructor to keep track of students' progress. One interviewee (Peer C) indicated that the instructor could see student progress whether in online or FTF environment by stating "I think it was easier for the instructor to see how the students were doing. I mean, students did not come to class and leave, but they could participate every time". Therefore, the instructor had more interaction opportunities to see how students are doing. Peer A also pointed out the role of online environment in this sense as:

> … We [as instructors] may not fully determine how active a student is in F2F environment. For example, a student that we personally admire or like his/her attitude can seem to us very active, or another student who is talking too much with little effectiveness can still seem very active. But it is harder to observe this online. The words are flying but postings are staying there. … That is, she could more objectively evaluate student participation in a blended learning environment. …

Another interviewee (Peer C) stated that it was also helpful for instructor to increase the quality of the course by increased interaction and communication opportunities by stating:

> … Using both environments enriched the interaction and communication opportunities for the course, which was great for the instructor to increase the quality of the course, for a course which is really demanding! ...

While explaining the major enablers, Peer A explained the increased interaction as the following:

> Initially, students can be able to communicate their individual characteristics such as being passive in a social environment. These students can be more active participants and interacting more with peers in the online environment. … Instructors are humans having emotional states. They can make a balance in their interactions with students with the use of blended environment in this way…

Peer B also regarded the use of online environment as an effective way to increase the communication and interaction opportunities. He stated his thoughts as "… Specific to this course, I found these functions [using online forum and adapting F2F course accordingly] enabled a plus to course."

**4.2.2.2 Instructor Experiences on the Barriers to Blended Learning Environment**

The themes under the barriers category included barriers of each environment and the barriers of the blended environment which included difficulties in management of the course, increased workload, overlaps, and creating harmony between two environments.

Barriers of the Online Environment

In the forum as the interactive facet of the online environment, initiating and managing discussions and orienting students to respond to discussion topics were great challenges. It was also a huge challenge for the instructor to arrange everything on the webpage. This problem mainly occurred at the beginnings of the term. On September 21, the instructor wrote,

> … This week, I am developing the online environment. I am trying to do my best for the visual design considerations. I am also trying to upload required documents to the online environment. Some links are problematic, I need to check each of them in relevancy and write a short synopsis linking to their content. Other thing that I am trying to complete is the determination of online discussion topics. It is really hard to determine one for each week…

On September 26, two students sent e-mail about the confusions on forum environment. The course instructor divided the topics into five groups for each group to discuss issues within their 10-member group. One student wrote "You divided forum into groups. Are we supposed to post to all groups or only to ours?" Yet, another student complained for not to being able to see the groups. The instructor has sent the following e-mail reply same day on September 28 to all students:

> I am attaching the Excel document once again. You are supposed to post your reflection to your group in forum. Please check your group number and post accordingly.

Peer B commented on the difficulties of initiating discussions and arranging everything as follows:

> … It can be a great burden for the instructor to arrange and initiate forum discussions for the instructor. Motivating all students, although it is more comfortable and encouraging for students to post online, is a challenge. Initially there is the need for several students to initiate posting a few comments. …

On October 3, the instructor wrote her challenge on the forum discussion as the following:

> It took a lot of time for me to upload documents to the webpage. When only a few people participated the discussions, I tried to encourage others by asking their opinions and providing feedback to the ones who wrote. …

Other than this, there were several technical problems for the instructor in the course site. It was usually related to the technical features of the system, which was soon solved. The LMS was developed in the department and some features were still being developed. For example, there was a problem with one student who complained that she posted a message in forum, but her post was shown with another student's name. The student sent the following e-mail to course instructor on November 27:

> hi                                                                                          teacher,
> today I post a reply to the part named "speaker-1" but after posting my reply I checked my writing and I have been very surprised because my writing seems to belong another person who is [X] and my name is [Y] this is very surprising I think .... So what can I do?

The instructor's reply was 8 min later the post and included the following explanation:

> I can delete the message so that you can write again with your name. The problem can be due to account problems. Sorry for the inconvenience. Anyway, please try to send once again please.

It was a big problem for instructor to maintain the proper functioning of the system. She also had difficulty in uploading the assignments with related due dates. The problems were quickly solved by the technical design team of the LMS but time devotion was still a challenge for instructor on these efforts. On December 8 she wrote:

> Today, I spent the whole day preparing online materials for students: writing the forum subject, organizing the documents, writing e-mails to the students informing them with announcements etc. What I wrote into the forum is a new discussion topic. For topic selection, I investigated many resources (books, online sources...) about possible cases on the evaluation of courseware. Then I decided to write an imaginary case about a Turkish school. I created the required folders in the forum. I also prepared a guideline document about how the presentations will be going on next week. And I informed students in "news" about it. I also found out that I need to change the order of contents in forum since there are a lot of items and I need to increase the level of discussions. That is from most important to least important. Also three groups of students came to my office. One group asked to me the presentations next week, if I read their design reports, and the final group asked me about CDs and presentations. I have also realized that a few people are checking my announcements, so I needed to write an e-mail, as they are using them more frequently.

Peer B expressed concern on technical support that the instructor needed to provide as the following:

> … She continuously needed to update, improve, manage, and organize the online environment. For this purpose, she needed to provide the technical support too and this is a very difficult task indeed. She needs to maintain the use of the online environment without any interruption.

One issue that emerged on the part of students was their tendency for using private area for discussions. This issue was raised both by the instructor and by Peer B. The instructor's notes on November 21-28 included the following regarding this issue:

> … For the feedback, some groups preferred to come to my office and talk to me directly, while some other students asked their questions in online environment as e-mail. They did not use forum for their questions, I think they don't prefer to publicize their ideas to whole class.

Peer B stated the following explanation on the need of students for privacy of messaging:

> … Again when I look at the online environment from students' perspectives I feel as "These are anonymous questions not known by my instructor" or "I did not understand this issue in F2F course." Is there a point in seeing who did not understand? [meaning no.] There is a student who did not understand [which is important] and wants to learn. Maybe there are 3 or more students who did not understand as well. Either students, or course assistants or the instructor herself

needs to explain [that issue]. I liked that part [students' asking their questions] but would be better if it was anonymous when I look from student perspective.

<u>Barriers of the F2F Environment</u>

The major barriers of the F2F environment for the instructor were the difficulty in the management of the crowded class size and involve them actively. Peer A mentioned about the challenges of F2F environment for the instructor as the effort for involving students into course in the following observation note on October 3:

> The students seem timid. The instructor tries to increase interaction by asking questions. But maybe since this is the first session, the students even have difficulty to say the name of Word program for an example of word processor!

The attendance sheet showed that in the F2F environment, the students' average attendance was 36 students. This was a huge number to control and manage. Peer C stated that the instructor had difficulties in the management of the course as following quote:

> … The instructor had the role of not only introducing the content, but also accomplishing the needs students have in the course. For example, sometimes there is the issue of gaining student interest…  The crowd of the class makes things harder. In one side she tried to cover all content but she had to keep their attentions throughout the session. They [students] tended to talk each other in the back rows, and she [instructor] tried to eliminate this problem, but had difficulty. …

Not only keeping interest, but also balancing their interaction and motivating students were challenges for the instructor as well. On December 19, she noted the following:

> … Some students are criticizing their friends just to criticize, either negatively or positively. Sometimes, it is very hard for me to establish common sense. I tried my best to relate these critics with the course content, but it is a crowded group, and it is very hard to do this…

Peer C commented on the issue as the following:

> For the topics that were very loaded, it was hard for the instructor to motivate students and keep their interest throughout lecture time. Students are inclined to get bored very quickly and they want to complete one task very quickly and move to another. [They want] more examples, more applications etc. They are very impatient to listen to theoretical information. … She also need to deal with students' complaints on course load. …

Barriers of the Blended Learning Environment

The barriers of the blended learning environment emerged as the difficulties in the management of the course, increased workload, overlaps, and creating harmony between two environments. The difficulties regarding the management of the blended course is related to the design of the portions of activities in F2F and online environment. When asked the difficulties of the blended course environment for the instructor, Peer A adduced the following explanation regarding this issue considering instructor's lack of expertise as a main cause:

> … For example it was very challenging for the instructor for the discussions to manage. If discussing part of the content in forum environment or in F2F environment.. Which one would be more effective? … There is a need to have expertise in using blended learning environments. It would be better if course instructor was more experienced. …

This concern was mentioned as a great challenge by Peer B as well. He explained his ideas as the following:

> … Whether to give announcements in class or in online, a topic will be covered in class or in online. This seems to be a great challenge. … The timing and managing the tasks in the environments.. These seemed difficult for the instructor.

One of the most important problems related to management issue was time management. It was very challenging for the instructor to decide on the time for spending for online and F2F discussions, providing feedback to the students, and managing student complaints or requests. Peer B stated that it might be very difficult for the instructor to arrange time for responding to student posts since there were a lot of responses. On December 11, the instructor noted:

> …. After he [the guest] left, there was no time for my presentation! … I think time management of instructor is important here. In order to avoid time excess problems, it would be better if I allocated only a 1- 1, 5 hour of session with the guest. Then I could use the hours left for my content and could relate it with what the speaker told. To solve this problem, I am planning to use the online environment…

On October 9, the instructor also mentioned about the time required to manage the online environment:

It took a lot of time for me to upload documents to the webpage. Since only a few people participated the discussions, I tried to encourage others by asking their opinions and providing feedback to the ones who wrote…

Although Peer B mentioned the benefits of using online environment in terms of saving time for course activities, he also pointed out the challenge of time management as "… While it saves time for the course, it steals from instructor time!" Peer C also stated concern on time dedication as the following quote:

Naturally, there is a need to devote a lot of time for the course. Since the course needed update information, the instructor needed to manage both online and F2F environment by controlling the environment. She needs to provide feedback all the time, answer their questions, etc. …

The second barrier emerged as the increased workload for the instructor which is very much related also to the first theme of time devotion issue. The instructor diaries revealed that the instructor had to spend a lot of time and devote a lot of time for the F2F and online portions of the course. The peers also remarked the increased workload for the instructor several times during the interviews regarding getting cognitively tired as well as devoting a lot of time. Related quotes from all sources are as the following:

Considering both the CEIT 209 course and the blended course that I offered last semester, I can say that instructor faces great workload for sure. … The instructor begins in a greatly busy schedule. … Secondly it [blended learning environment] is tiring for instructor cognitively as well as physically. … When students ask in-depth questions anytime in class or online environment, you need to provide immediate answers. The instructor needs to be competent in terms of knowledge repertoire. … It increases the workload: that is, it requires knowledge gains as well as time devotions. (Peer A)

In one hand there is the possibility of lecturing and making question-answer at the last 10 min and finish up the course until the next week. In the other hand, as it is in this course, you have to manage time because there is a course following a week time. For example, there was a part in the forum for students to post their problems and challenges etc. Even though there is no forum topic question for the week, any student can post his question or problem. … At this time the instructor needs to dedicate her/his time at least one hour daily, which means a total of 6 hours more time and workload than F2F course. (Peer B)

The content of the course was really loaded. Considering the guest sessions, discussions, presentations, and projects, it looked very hard to manage them all. … It was too much for an instructor. It would be a great burden if multiple blended courses are offered. (Peer C)

It took a lot of time again to upload documents and links to the webpage. I was initially photocopying, then converting to PDF format and then uploading to the

web environment. For the online presentation, I spend at least 5 hours to record my voice, and synchronize them with the PPT slides. ... (Instructor Diary, November 25, 2006)

The instructor's notes clearly reflected the workload that was spread throughout the week for her. Regular preparation time for F2F environment was doubled with the online environment. In the online environment, she needed to deal with students' posts and the technical maintenance of the system as well as the upload of documents and forum posts. For an example of the tasks she was engaged, her notes are given as quotes below including three days' workload:

> 05. 12.2006: Today was a mass for me to organize and manage the time for course hour. Because the subject was too loaded, and I wanted my students to be competent of the strategies for designing CAI projects as well as getting familiar to them. I had one guest for the topic. … I will now upload the ppt document and revise the related links and e-sources. Then I will create a thread on guest speakers. …

> 07.12.2006: Today, I spent whole day preparing online materials for students: writing the forum subject, organizing the documents, writing e-mails to the students informing them with announcements etc. … What I wrote into the forum is a new discussion topic. For topic selection, I investigated many resources (books, online sources…) about possible cases on the evaluation of courseware. Then I decided to write an imaginary case about a Turkish school. I created the required folders in the forum. I also wrote a guideline about how the presentations will be going on next week. And I informed students in "news" about it. I found out that I need to change the order of contents in forum since there are a lot of items and I need to increase the level of discussions. That is from most important to least important. … Three groups of students came to my office. One group asked me about the presentations next week, if I read their design reports, and the final group asked me about CDs and presentations. … I have also realized that a few people are checking online, so I needed to write an e-mail, as they are using them more frequently. …

> 08.12.2006: Today, I spent my whole day revising the design documents and giving feedback. But I could not even finish them all. Five students came to take their CDs to revise. We informally talked to them on group member issues. … I created a new forum topic and added a new topic for each group. I also informed students what to do there. …

Overlaps in using online and F2F environment was argued by Peer A as a great challenge. He criticized the issue by saying "… Activities can support each other or can inform each other, but should not repeat each other. This sometimes happened in the course in terms of discussions". The course instructor reflected her concern by stating the following on November 28:

> Sometimes, it was hard for me to summarize and rephrase student responses to my questions. I tried to provide positive reinforcement every time. But this week I felt stuck in the similar discussion we have made in ID discussion [latest online discussion], some are making it hard for me to create a balance. …

Finally, creating harmony in the two environments was another barrier for the instructor. Due to the heavy content and workload needed to complete assignments, the course was challenging for instructor to balance the portions in each environment in terms of how much time would be needed for each activity, what function each activity would have in the online or FTF environment and what relevancy it would have in the overall course. These are all related to design considerations which affect the implementation of the course:

> … Instructor tried to avoid overlaps: which one is better in F2F and which one in online. She tried to have students' ideas on the activities of the course to manage the balance issue. … Of course these are tiring issues: F2F lecture activities, project, assignments, discussions, etc. She will give one grade at the finals. One final grade for all the different tasks: it must be very hard for the instructor. (Peer A)

> … She [the instructor] tried to all tasks alone. But, blended environment was a tiring one and without extended experience, I guess it was hard for her to manage all things alone. Keeping balance for everything for such a demanding course must be hard for her. … (Peer C)

Deciding on how and how much portion of the online and FTF activities will be graded was another barrier for the instructor. As all interviewees mentioned, being a novice instructor, instructor had more barriers during course implementation period due to her limited previous experience in teaching. Related quotes are as follows:

> … There needs to have expertise to offer blended courses. All right, I will use F2F and online together, but each have its own advantages and disadvantages. … I think the instructor was not very experienced in terms of balancing all activities. This is related to her prior experience I guess. (Peer A)

> … She [the instructor] needed to decide what portion she will assign to online part and what portion to F2F part. I don't exactly know how she planned evaluation, but it must be a difficult task for her to balance them. … Will she grade online environment based on participation logs, quality of responses, how much portion will be graded for F2F activities, or projects… (Peer B)

> I tried to figure out my evaluation chart once again, and it is really hard to balance the participation for online and FTF hours. I have difficulty in grading them. I think one must consider how to evaluate FTF and online settings at the very beginning of the course. … (Instructor Diary, January 6, 2007)

**4.2.3 Student Experiences on the Implementation**

Data on student experiences on the implementation of the course were gathered from students' weekly reflection papers, semi-structured interviews, student perceptions questionnaire, and forum transcripts as well as documents on Website logs and e-mails.

Students were asked to describe their experiences that they had in the course in one sentence in the questionnaire. The most frequent answer was "helpful" (n=4), fun (n=2), good (n=2) and productive (n=2). The rest of the responses included several negative responses like "difficult" or "ordinary" and mostly positive items like "great" "interactive", or "perfect". It was interesting that several responses defined the experience to be identical to "assignment", "project", "web-based course", or "efficiency in time".

Students were also asked their preferences on the learning environment both at the beginning and end of the semester. As shown in Table 4.13, very few students preferred only F2F courses in both periods of the semester with a slight increase in favor of end of semester (from 5% to 12.5%). The number of students with a preference for online environment, however, decreased from 27.5% to 10% from the beginning to the end of the semester. Majority of students preferred blended learning environment in both times. There is a slight increase from the beginning of the semester (67.5%) to the end of the semester (77.5%).

**Table 4.13** Student Preferences on Course Delivery

| Learning Environment | Beginning of the Semester | | End of the Semester | |
|---|---|---|---|---|
| | f | % | f | % |
| Traditional (F2F) | 2 | 5.0 | 5 | 12.5 |
| Online | 11 | 27.5 | 4 | 10.0 |
| Blended (Both F2F and online) | 27 | 67.5 | 31 | 77.5 |
| Total | 40 | 100 | 40 | 100 |

**4.2.3.1 Student Experiences on the Enablers of Blended Learning Environment**

The student participants rated their level of agreement with the questionnaire statements on the enablers of the blended learning environment using a five-point Likert-type scale with 1 indicating 'Strongly disagree', 2 indicating 'Disagree', 3 indicating 'Neutral', 4 indicating 'Agree', and 5 indicating 'Strongly agree'. The number of responses, percentages, means, and standard deviations of all statements are given in Table 4.14.

The results indicated that majority of students agreed or strongly agreed with the following items: "I had effective interaction and communication with the course instructor." (82.5%, M=4.22), "I developed different perspectives via working on variety of resources to complete assignments and project" (82.5%, M=4.20), "Course instructor efficiently used the blended learning environment."(87.5%, M=4.17), and "The course provided opportunity to contribute to course activities (projects, assignments, etc) on my own." (85.0%, M=4.15). The lowest mean was for the item "My interests and preferences were taken into considerations in course design" with a mean of 3.25. The overall mean for all items was 3.87 denoting an agree level for the rest of the items.

**Table 4.14** Students' Responses to Possible Enablers of Learning in Blended Learning Environment

| Statements | | Strongly Disagree | Disgree | Neutral | Agree | Streogly Agree | M | SD |
|---|---|---|---|---|---|---|---|---|
| I had effective interaction and communication with the course instructor. | f (%) | 0 | 0 | 17.5 | 42.5 | 40.0 | 4,22 | .73 |
| | n | 0 | 0 | 7 | 17 | 16 | | |
| I developed different perspectives via working on variety of resources to complete assignments and project. | f (%) | 0 | 2.5 | 15.0 | 42.5 | 40.0 | 4,20 | .79 |
| | n | 0 | 1 | 6 | 17 | 16 | | |
| Course instructor efficiently used the blended learning environment. | f (%) | 0 | 0 | 12.5 | 57.5 | 30.0 | 4,17 | .63 |
| | n | 0 | 0 | 5 | 23 | 12 | | |
| The course provided opportunity to contribute to course activities (projects, assignments, etc) on my own. | f (%) | 0 | 2.5 | 12.5 | 52.5 | 32.5 | 4,15 | .73 |
| | n | 0 | 1 | 5 | 21 | 13 | | |
| Course materials and resources were rich. | f (%) | 0 | 5.0 | 10.0 | 55.0 | 30.0 | 4,10 | .77 |
| | n | 0 | 2 | 4 | 22 | 12 | | |
| Having discussions both in F2F and online environments was good. | f (%) | 0 | 5.0 | 7.5 | 60.0 | 27.5 | 4,10 | .74 |
| | n | 0 | 2 | 3 | 24 | 11 | | |
| I had timely feedback. | f (%) | 0 | 2.5 | 12.5 | 57.5 | 27.51 | 4,10 | .70 |
| | n | 0 | 1 | 5 | 23 | 1 | | |
| I had the opportunity to apply what I have learnt via diverse activities (project, assignments, etc). | f (%) | 0 | 5.0 | 15.0 | 47.5 | 32.5 | 4,07 | .82 |
| | n | 0 | 2 | 6 | 19 | 13 | | |
| The interaction and communication opportunities were rich. | f (%) | 0 | 5.0 | 12.5 | 55.0 | 27.5 | 4,05 | .78 |
| | n | 0 | 2 | 5 | 22 | 11 | | |
| The course provided opportunity to express my thoughts on what I learnt (F2F or online). | f (%) | 0 | 2.5 | 17.5 | 52.5 | 27.5 | 4,05 | .74 |
| | n | 0 | 1 | 7 | 21 | 11 | | |
| My participation was encouraged with the use of diverse instructional methods (question-answer, cooperative learning, forum discussions, etc). | f (%) | 0 | 5.0 | 12.5 | 55.0 | 27.5 | 4,05 | .78 |
| | n | 0 | 2 | 5 | 22 | 11 | | |
| The F2F activities supported online activities. | f (%) | 0 | 7.5 | 15.0 | 55.0 | 22.5 | 3,92 | .82 |
| | n | 0 | 3 | 16 | 22 | 9 | | |
| I had the opportunity to use my own learning styles (reading, listening, explaining, applying, etc) with the use of bended learning environment. | f (%) | 0 | 7.5 | 10.0 | 67.5 | 15.0 | 3,90 | .74 |
| | n | 0 | 3 | 4 | 27 | 6 | | |
| The course provided the opportunity to learn from my peers (F2F or online). | f (%) | 2.5 | 10.0 | 10.0 | 57.5 | 20.0 | 3,82 | .95 |
| | n | 1 | 4 | 4 | 23 | 8 | | |
| F2F and online assessments supported each other. | f (%) | 0 | 2.5 | 32.5 | 52.5 | 12.5 | 3,75 | .70 |
| | n | 0 | 1 | 13 | 21 | 5 | | |
| I was able to actively participate the course (F2F or online). | f (%) | 2.5 | 7.5 | 15.0 | 65.0 | 10.0 | 3,72 | .84 |
| | n | 1 | 3 | 6 | 26 | 4 | | |
| I was highly motivated for the course. | f (%) | 0 | 12.5 | 22.5 | 50.0 | 15.0 | 3,67 | .88 |
| | n | 0 | 5 | 9 | 20 | 6 | | |

**Table 4.14** Students' Responses to Possible Enablers of Learning in Blended Learning Environment (cont'd)

| Statements | | Strongly Disagree | Disgree | Neutral | Agree | Streogly Agree | M | SD |
|---|---|---|---|---|---|---|---|---|
| I could receive feedback for real-life tasks in course activities. | f (%)<br>n | 0<br>0 | 15.0<br>6 | 20.0<br>8 | 52.5<br>21 | 12.5<br>5 | 3,62 | .89 |
| I had effective interaction and communication with my classmates. | f (%)<br>n | 2.5<br>1 | 7.5<br>3 | 30.0<br>12 | 45.0<br>18 | 15.0<br>6 | 3,62 | .92 |
| The course provided opportunity to interact with other related content areas of concern (education, psychology, technology). | f (%)<br>n | 0<br>0 | 12.5<br>5 | 32.5<br>13 | 35.0<br>14 | 17.5<br>7 | 3,58 | .93 |
| The online environment provided me opportunity to recall what I have learnt in F2F environment. | f (%)<br>n | 0<br>0 | 20.0<br>8 | 15.0<br>6 | 55.0<br>22 | 10<br>4 | 3,55 | .93 |
| The F2F environment provided me opportunity to recall what I have learnt in online environment. | f (%)<br>n | 0<br>0 | 17.5<br>7 | 32.5<br>13 | 40.0<br>16 | 10<br>4 | 3,42 | .90 |
| My interests and preferences were taken into consideration in course design. | f (%)<br>n | 2.5<br>1 | 10.0<br>4 | 52.5<br>21 | 30.0<br>12 | 5.0<br>2 | 3,25 | .80 |
| **Overall** | | | | | | | **3.87** | |

The analysis of qualitative data was grouped into three major categories of the enablers for each learning environment: the unique benefits of online environment, the unique benefits of F2F environment, and the complementary strengths of each environment that constituted the blended course. Enablers of the online environment included opportunity to learn content better, learning update info on course, and opportunities of forum environment including increased participation and motivation, communication opportunities with instructor, comfort on responding, learning from peers, having time flexibility, and opportunities to voice opinions. The enablers of the F2F environment included being familiar/ used to environment, being more comfortable for participation, more self-disciplined, instant feedback opportunities, being more human, and opportunities of guest seminars including motivation, real-world relevance, and finding answers of questions in mind. Finally, the complementary strengths were facilitation of different environments to catch all points of course content, increased motivation, opportunity to voice opinions and see others' opinions more, time efficiency,

reinforcement of learning, better instructor monitor on student progress, more serious course attitude, more instructor support, wide access to resources, continuity in course, and providing more area for discussion.

Students mostly regarded F2F environment as the place where they gained the background info and online environment as the place where they could study more, discussed issues, and had both prior info and complementary knowledge related to F2F course content.

> We learn the subjects in F2F more effectively. In the online environment, we have the opportunity to make more research on the subject and make comments on them. (Weekly Reflection Paper Respondent – October 3, 2006)

> It is good to initially learn the theoretical information F2F. After all, we can find the related topics and issues in online environment ourselves. (Weekly Reflection Paper Respondent – October 17, 2006)

Enablers of the Online Environment

The online component of the course was regarded as "complementary" to F2F instruction (Students B, D, G, H and I), or "continuity" of F2F instruction (Students A, E, and H). Regarding the opportunity of learning content better, students mentioned about the opportunities of revising F2F content, increased efficiency of participation in F2F environment, and learning through variety of rich resources. These are several quotes taken from responses in questionnaire open ended items, student interviews, and weekly reflections regarding this first theme:

> … It [the online environment] was very helpful for revising the content we learnt in F2F course for example, we could have another opportunity to study things over there. I find it helpful… (Student C)

> … Class sessions are, more or less, is a limited environment. But online environment is always there for you to serve you whether be the communication facility or the resources facility, … we could use many resources to help us… (Student G)

> [The online environment contributed to my learning this week because] I can respond more comfortably due to having more time to think. (Weekly Reflection Paper Respondent – October 3, 2006)

> [The most important activity that contributed to my learning was] the links that were interesting to me. For example I learnt about a website that was on English words use as a material [drill]. This helped me concentrate on the F2F course today. (Weekly Reflection Paper Respondent – October 3, 2006)

> … For me, online environment is kind of [place where one can] search, go into links or linking throughout the pages. That is, you discover and find the information by linking and linking. You search information within variety of resources and this was much better… (Student H)

> During F2F classes, everybody may not be able to take turn to participate. But it was online environment where everybody had the same opportunity to participate and voice opinions… (Survey Respondent)

Regarding learning update information on course, Student I mentioned about the opportunity to gather the latest news on course and online processes. She stated:

> … Instructor could announce the latest news whenever she needs using the online environment. The course presentation slides were there which enabled me to access directly to resources. Whenever there is an emergent thing, I could find online. …

Another issue was learning to make research better in online environment. Student B argued that with this course, his research abilities in online environment was improved. Student H stated similar argument when she said:

> … A prior research. You need to understand the question or argument very well to respond. You have the chance to re-read again and again. After that, you can find out that there are things you don't understand or you can question a concept in there. You can immediately google them, or investigate the resources given in the course website and then turn back to your responses. … In order to respond in the mode of 'I know this', or write meaningful and convenient responses, you need to do research. This was really good because with this need, I needed to read at least several articles and make research…

The opportunities that forum environment offered were centered on increased participation and motivation, more comfort in responding, learning from peers, and opportunities to voice opinions. Regarding increased participation and motivation, students remarked the opportunities of peer and instructor feedback. They could learn from real-like scenarios which were mostly interesting to them. Interestingly, competing with peers and being curious on what their peers wrote were other motives behind their participation and motivation as well. Here are several quotes from students' responses regarding these issues:

> … Because when a friend of mine responds to my responses, I feel happy. Or when the instructor responds, I feel even more motivated. You feel like your responses are taken into consideration, or this forum environment is being tracked. Nevertheless I feel comfortable when someone responds to what I wrote there with the idea that someone is really reading them. When no one responds, I feel like you are alone writing to yourself. … (Student A)

… In the end, you put yourself in the place of the person in the scenario. That is, you think of what you would do in that situation. For these real-like scenarios, you definitely write something which helps learning on the content… (Student A)

… I liked the forum environment of this course very much. … [Because] We could discuss interesting topics in forum. We could also have fun in discussing the scenarios… (Student E)

… It [forum] increases participation. When I see three or five people wrote something there, I feel like 'wow how come I have no response'. I feel like I missed something and I have to have an idea on that topic. We are learning about the content in this department and I have to deserve it [by responding what I learnt]… A curiosity on who wrote what emerges. Is there anything new or any new responses? These were very enjoyable for me [to participate]… (Student I)

I could find the chance to learn from my peers and develop different perspectives as well as express my own ideas thanks to the online forum discussions. (Survey Respondent)

… Some of the friends were not voicing their opinions in F2F. But they comfortably participate to online forum. Reading the posts of these peers were very helpful for me to approach issues in a better perspective. [Because] I realized that the peers who were not talking F2F had great ideas. (Survey Respondent)

There is no time limitation and I can express my thoughts comfortably. (Survey Respondent-explanation for participating online environment as 'very active')

[Online environment contributed to my learning this week because] Discussions help us improve language and discussion abilities and learn [content] better. (Weekly Reflection Paper Respondent – November 11, 2006)

Regarding the communication opportunities with instructor, Student I stated "When a question bears in my mind, I don't want to wait the next F2F session. It is a great opportunity of online environment to ask the question at the moment." A survey responded wrote "In online environment, I could comfortably share opinions and ask my questions to instructor and receive answers."

The online environment also offered students study flexibility in terms of time. This was enhanced with variety of resources and links and asynchronous nature of forum environment. Related quotes are as follow:

…I was using online environment when I was available or when I remembered to check things. … You get online whenever you want. For example, when I tackle with something related to course content, I get online to learn about it, or if there is an activity to complete, I get online again. … If there is a forum topic released for the week, you have a week time to post. That means no time limitation. Post on Monday at latest if the course is on Tuesday or whenever you are available. It [online environment] does not pus burden on student. (Student A)

… It saved time for us to study. … Additionally, instead of googling or searching elsewhere, we had quite many resources to study in online environment. It was advantageous in this way too. … (Student D)

…That is, you discover and find the information by linking and linking. You search information within variety of resources and this was much more better. … There were peers who have really great course load, or some have less. But online environment offered lots of resources regarding this minimum and maximum time allocation. I think this feature was very effective. (Student H)

[Online environment contributed to my learning this week because] It is easier to reflect my opinions in forum environment since our F2F inevitably limited. (Weekly Reflection Paper Respondent – October 3, 2006)

Several students also remarked the comfort of online environment for them to participate. This comfort was attributed to an environment with no F2F society. Student B expressed the difference of participating online than F2F as "not being in the social environment" and stated that he was much more comfortable with this. One student wrote the explanation of her choice of strongly agree for the item "Online environment contributed to my learning this week" on October 17 as "I feel myself more comfortable in studying in the online environment better" . Another student stated as the following for the same item on November 7 as "I can feel and act more comfortable and free in online environment." Student D explained his thoughts as:

It is easier and more comfortable to participate [online]. In F2F environment, you don't have much time although I like F2F discussions better. There is the comfort of writing in online environment. You can post whatever you like. Just whatever.

One student also noted another feature of online environment that contributed to her/his learning. She wrote on the weekly reflection paper on October 3 this as "I can miss the points discussed in F2F course, but there is no such risk online". This can be attributed to the time flexibility that online environment offers. Another student mentioned the visual aspect as "There is more opportunities in terms of visual appeal [in online environment]" on the weekly reflection paper on November 7. Another issue remarked was the creativity as "I can use my creativity much more effectively in online environment than F2F environment" by a weekly reflection paper respondent on October 3.

Enablers of the F2F Environment

F2F environment was the learning environment for students that they were used to from their very first school days. Therefore, this was an important consideration for them in

assessing their experiences in the course. They regarded this issue as a benefit of F2F environment. Related student responses were as below:

> … F2F is sometimes better because we have always had F2F courses until we became university students. Therefore it is hard to go beyond what we are already used to. It is better to participate F2F at times… (Student C)

> The best feature of F2F environment for me is the use of traditional approach. I mean, we are used to F2F courses with thirty or forty students and the instructor within a question-answer, or dialogues framework. Maybe it is because we are used to F2F environment from our primary school years that we find it more advantageous… (Student J)

> [The F2F course contributed to my learning this week because] When it is F2F, there is a necessity of participation to the course actively. I think this makes the course content be more permanent (Weekly Reflection Paper Respondent – October 3, 2006)

> Nothing can replace the F2F environment, I think. I can always ask my questions and receive direct answers in F2F classroom. (Weekly Reflection Paper Respondent – November 7, 2006)

The students stated that F2F environment were more comfortable for them to participate and voice opinions. Student A remarked:

> … Stating opinions in F2F environment is more comfortable for me because you can see the reactions of the people in F2F interaction. At least, while explaining something, you can understand if it was theoretically right or wrong by looking at instructor face. You can see it from mimics and gestures…

Student I mentioned on the feature of F2F environment that made her feel more disciplined to study. She said: "When it is not F2F, I can neglect studying, but F2F makes it more disciplined". This concern can be regarded as the synchronic effect of F2F environment to obligate student to devote certain time for course. Instant feedback opportunities can be linked with this feature as well. It was a major enabler of F2F environment and was stated as:

> … F2F environment was successful because I could be able to ask the issues which were not clear to me. Moreover, when everyone is speaking in the same environment it was more comfortable. … The instructor is explaining something and you can ask your questions immediately… (Student E)

> [The F2F course contributed to my learning this week because] I had the opportunity to learn content both by seeing and listening. (Weekly Reflection Paper Respondent – October 3, 2006)

Responses on the enablers of F2F were also centered on its more human side. Students stated that since everybody shared the same time and place, they could understand feelings better by eye-contact and feeling the same atmosphere. It also helped socialize which was a must for most students. These are several quotes taken out of data:

> … In F2F environment, you feel what your peer feel or aim. For example if he/she says something just for fun, you can understand this when he/she says while smiling… (Student A)

> … When it is F2F, I need to listen to course because the instructor is talking. It is exciting and more effective. … When an instructor explains the subject, it is better. When you are in dormitory or at home you are alone. But in F2F environment you are sitting next to a peer, talk, share, etc. … (Student C)

> ...The best thing of F2F environment is the opportunity to feel your peers with you, to respond at the specific time. Also, I like eye-contact between student and instructor and having her feedback… (Student H)

> … I found F2F lectures very productive and felt they were interesting and fun. (Survey Respondent)

> We could present our instructional CD evaluations in F2F environment. I find this helpful because I don't think it would be this much effective in online environment. (Weekly Reflection Paper Respondent – December 26, 2006)

Two students also remarked the instructor support in F2F environment in the reflection report on October 3 as "I find it very helpful that our instructor answer our questions directly in F2F" and "Instructor control always increases efficiency of my learning". Another student noted that group work and question-answer parts of F2F lecture made the course more enjoyable. The reflection reports on October 17 included similar responses. One student pointed out the instructor guidance as: "[The most contributing activity of this week was] our instructor's directing us on certain issues. Especially her guidance is important." Another student stated that she found F2F lecture as more interactive due to instructor presentations. One student noticed that as students they took the instructor as a model in applications and sample uses of instructional software.

Comments on the reflection reports on December 26 revealed that students found the student F2F presentations on instructional CD material evaluations very effective in their learning for several reasons. Revisions of the course content, having supportive information for their projects, seeing the popular instructional products of big companies, and having more vision were among these concerns. The comments showed that students were very satisfied with this activity being held F2F since they could see all friends'

feedbacks and instructor's immediate feedback. One student also remarked that he/she could be able to change his/her misunderstandings on certain topics with the discussions.

An important activity of F2F course as mentioned by participant students were guest seminars. The responses showed that students were more motivated, linked the content with real life, found it a new experience, and could find answers to their questions. Regarding the motivation issue, students remarked that the guests served as role models for their future jobs and their seminars left the impression that students were doing something authentic and worthy. These were very motivating for them as they felt they learnt better. Some related quotations are as below:

> …The things that were presented theoretically in the courses seemed too abstract for me before the guest seminars. With their seminars, I realized that they are being used in practice, in real. After all, experience of a person is very important for the other. If a person is telling something, that means he has an experience on it and you learn from it instead of testing again. You benefit from the experience. One can see the self-confidence of that expert person. He has the carrier of your dreams, and you see him in front of you. This really affects me positively. I went to courses with more enthusiasm, studied with more enthusiasm, and felt that your project is worth doing. It is not a project to have a course grade. You do it by a real desire and you see that it contributes to you. And this really makes me feel happy. (Student A)

> It was good that experts from different workplaces came and concerned with our course. It was good for reinforcement and consolidation. It was a great opportunity for us who aimed to have the similar carriers… (Student B)

> … We are not learning the subject just for course, they [the guests] are creating storyboards as well, and they are preparing reports as well. They are doing all what we were doing in the course. As a result, their seminars showed that we were not doing assignments for useless reasons… I think these must be in all courses. … (Student C)

> The instructor's teaching style was effective. The guests that she invited motive me a lot for the course… (Survey Respondent-explanation for the most contributing aspects of the blended learning environment)

> … The guests in the lecture hours were very helpful in terms of showing a vision to us. (Survey Respondent-explanation for the most contributing aspects of the blended learning environment)

> [The most contributing activity for my learning this week was] instructor's taking support the content from someone else who work on that subject in teaching that subject. (Weekly Reflection Paper Respondent – October 17, 2006)

[The most contributing activity for my learning this week was] the hints that our guest gave us on the usability and design issues for a project. Thanks for that. (Weekly Reflection Paper Respondent – December 12, 2006)

Other issues related to guest seminars were having real world relevance and finding answers of questions in mind. Student D stated that expert seminars were very helpful for him to learn about the real working environment and the organizational issues related to the specific job descriptions. He also noted that it made the course go beyond theory but "put into practice". Student E remarked that the seminars would be very helpful for their future and helpful for their project processes as well. She noted that "When a guest explained what they were doing in their projects, we were trying to apply it in our project as well. Like meetings." Finally, Student I emphasized that expert seminars was a different activity which was an advantage for her. She also noted that it helped clear questions in mind by stating:

> … It was a different activity. It was also an activity which made F2F classes different. We could see a live example☺ We could see our potentials on what we can do. We were pessimistic on our future carriers… we now can say we will be Instructional Technologists thanks to these expert seminars. Moreover, these guests answered questions. We could have answers of what were unclear in our minds. I think it was really helpful….

One student reflected on December 12 that he/she found the F2F discussions and feedback system very helpful because "The comments and critiques help a lot for our project development process. We [our group] could be able to see the issues that needed to be improved better this way." Having better benefit on discussions and comments was a concern mentioned by other students in the reflection reports in other weeks as well.

Enablers of the Blended Environment: Complementary Strengths

The use of blended learning environment offered several enablers for students for their learning in the course. These were not only due to the strengths of each environment that were discussed in the previous sections, but their complementary strengths that made student experiences a unique one. These included facilitation of different environments to catch all points of course content, increased motivation, opportunity to voice opinions and see others' opinions more, time efficiency, reinforcement of learning, better instructor monitor on student progress, more serious course attitude, more instructor support, wide

access to resources, continuity in course, and providing more area for discussion. Student responses were summarized in frequencies and percentages in Table 4.15.

**Table 4.15** Summary of Students' Qualitative Responses to Enablers of Blended Learning Environment

| Themes | Perceived Enabler | Participants from | f | Out of | Total Interviewees f | Total Interviewees % | Total Survey Respondent f | Total Survey Respondent % | Total Reflection Report Respondent f | Total Reflection Report Respondent % |
|---|---|---|---|---|---|---|---|---|---|---|
| Facilitation of different environments to catch all points of course content | Having more engagement with course content | Interviews | 4 | 10 | | | | | | |
| | | Survey | 11 | 40 | | | | | | |
| | | Reflection Report | 2 | 40 | | | | | | |
| | Helpful in clarifying confusions | Interviews | 4 | 10 | 6 | 60.0 | 15 | 37.5 | 8 | 20.0 |
| | | Survey | 4 | 40 | | | | | | |
| | | Reflection Report | 2 | 40 | | | | | | |
| | Catch things that was missed | Interviews | 3 | 10 | | | | | | |
| | | Survey | 4 | 10 | | | | | | |
| | | Reflection Report | 5 | 40 | | | | | | |
| Increased motivation | Be able to voice opinions | Interviews | 4 | 10 | | | | | | |
| | | Survey | 7 | 40 | | | | | | |
| | | Reflection Report | - | 40 | | | | | | |
| | Real-world relevance of activities | Interviews | 7 | 10 | 8 | 80.0 | 10 | 25.0 | 5 | 12.5 |
| | | Survey | 2 | 40 | | | | | | |
| | | Reflection Report | 5 | 40 | | | | | | |
| | Learning different skills | Interviews | 3 | 10 | | | | | | |
| | | Survey | 4 | 40 | | | | | | |
| | | Reflection Report | - | 40 | | | | | | |
| Opportunity to voice opinions and see others' opinions more | Use of activities to help students discuss within groups or as a class. | Interviews | 5 | 10 | | | | | | |
| | | Survey | 6 | 40 | | | | | | |
| | | Reflection Report | - | 40 | 7 | 70.0 | 10 | 25.0 | - | - |
| | Provide area for discussion both F2F and online | Interviews | 3 | 10 | | | | | | |
| | | Survey | 9 | 40 | | | | | | |
| | | Reflection Report | - | 40 | | | | | | |

**Table 4.15** Summary of Students' Qualitative Responses to Enablers of Blended Learning Environment (cont'd)

| Themes | Perceived Enabler | Participants from | f | Out of | Total Interviewees | | Total Survey Respondents | | Total Refl. Report Respondents | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | f | % | f | % | f | % |
| Time efficiency | Ask their questions without any time limitation | Interviews | 4 | 10 | | | | | | |
| | | Survey | 3 | 40 | | | | | | |
| | | Reflection Report | 2 | 40 | 5 | 50.0 | 3 | 7.5 | 4 | 10.0 |
| | Flexibly study the content of the course | Interviews | 4 | 10 | | | | | | |
| | | Survey | 2 | 40 | | | | | | |
| | | Reflection Report | 3 | 40 | | | | | | |
| Reinforcement of learning | F2F supported online and vice versa | Interviews | 7 | 10 | | | | | | |
| | | Survey | 3 | 40 | | | | | | |
| | | Reflection Report | 4 | 40 | | | | | | |
| | Benefits of instructional strategies such as group work, quiz, and projects | Interviews | 9 | 10 | 9 | 90.0 | 4 | 10.0 | 22 | 55.0 |
| | | Survey | 4 | 40 | | | | | | |
| | | Reflection Report | 22 | 40 | | | | | | |
| Better instructor monitor on student progress | Opportunity to demonstrate student efforts to instructor. | Interviews | 2 | 10 | | | | | | |
| | | Survey | - | 40 | 2 | 20.0 | - | - | - | - |
| | | Reflection Report | - | 40 | | | | | | |
| More serious course attitude | more serious course attitude | Interviews | 1 | 10 | | | | | | |
| | | Survey | - | 40 | 1 | 10.0 | - | - | - | - |
| | | Reflection Report | - | 40 | | | | | | |
| More instructor support | Active instructor participation to learning environment | Interviews | 2 | 10 | | | | | | |
| | | Survey | 4 | 40 | 2 | 20.0 | 4 | 10.0 | 1 | 2.5 |
| | | Reflection Report | 1 | 40 | | | | | | |

**Table 4.15** Summary of Students' Qualitative Responses to Enablers of Blended Learning Environment (cont'd)

| Themes | Perceived Enabler | Participants from | f | Out of | Total Interviewees | | Total Survey Respondents | | Total Refl. Report Respondents | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | f | % | f | % | f | % |
| Wide access to resources | Both F2F and online | Interviews | 4 | 10 | | | | | | |
| | | Survey | 8 | 40 | 4 | 40.0 | 8 | 20.0 | 10 | 25.0 |
| | | Reflection Report | 10 | 40 | | | | | | |
| Continuity in course | learning with different perspectives | Interviews | 4 | 10 | | | | | | |
| | | Survey | 1 | 40 | 4 | 40.0 | 1 | 2.5 | - | - |
| | | Reflection Report | - | 40 | | | | | | |
| Providing more area for discussion | Discussion opportunity in online and F2F | Interviews | - | 10 | | | | | | |
| | | Survey | 5 | 40 | | | | | | |
| | | Reflection Report | - | 40 | 2 | 20.0 | 7 | 17.5 | 4 | 10.0 |
| | More peer interaction | Interviews | 2 | 10 | | | | | | |
| | | Survey | 2 | 40 | | | | | | |
| | | Reflection Report | 4 | 40 | | | | | | |

Students stated that with the use of two environments, they had the opportunity to learn the issues that they missed in the other with the facilitation of different environments to catch all points of course content. It allowed more engagement with course content and was very helpful in terms of announcements, communications, and interactions in clarifying confusions. Related quotes mentioned by participants are as follows:

> … Certainly I missed things and issues covered in F2F classes and whenever we made discussions on these issues, I remembered or re-studied them in online environment. This is kind of applying in online what you learnt in F2F by discussing it… (Student A)

… For example one of our peers responded in forum to another peer, but it was clear that there was a misunderstanding in content. In F2F environment, all of these issues were clarified. Sometimes instructor announced guest seminars in class, but if there was a new issue, these were announced in online… it [blended learning] created the interaction among F2F and online. (Student A)

... To respond in online forum, you need to know the basic theoretical information, which was gained in F2F classes. … We discussed the things that we learnt online as well. (Student B)

… I did not have problem in F2F. The only thing was that I could not participate due to coming unprepared or preferring other peers talk. Nevertheless, I could fulfill this lack online. (Student H)

I thought I understood everything in class. But when I went home and repeated what I learnt, I found things that I missed. I could write to forum and have answers from there (Student J)

It [blended learning environment] allowed to study in online environment the things that I missed in F2F class or the things that I felt I need to learn more. (Survey Respondent)

I could easily complete the issues in online that I missed in F2F class. (Survey Respondent- explanation for preferring blended course environment for CEIT 209)

Sometimes the topics to be covered in F2F environment cannot be presented fully due to time limitation. For this reason, following topics on the Internet helps my learning. (Weekly Reflection Paper Respondent – October 17, 2006)

Although I liked learning in the online environment better than learning in the F2F environment, I feel F2F courses have a different place in my learning. For example, in F2F environment I find the answers of questions which never come to my mind in online. (Weekly Reflection Paper Respondent – November 7, 2006)

I have read the assigned readings [articles provided in online environment] and I felt they helped me understand the content that was presented in today's lecture. (Weekly Reflection Paper Respondent – November 7, 2006)

It was very effective to clarify the issues in F2F online environment for the ones that we could not understand well in the online environment. … It was also good that we had online video session for the week in which we could not have opportunity to have the F2F session. (Weekly Reflection Paper Respondent – November 28, 2006)

I found online environment very much contributed to my learning this week because I could be able to have prior knowledge thanks to the links given in the forum and the syllabus of the course. (Weekly Reflection Paper Respondent – December 5, 2006)

… I think it was better to have the evaluation process [evaluation of sample projects and students initial drafts of projects] in F2F environment in terms of

effectiveness. Because, the discussions and one-to-one interaction would have been slower in the online environment, while we have the immediate feedback and discussion opportunity better in F2F environment. (Weekly Reflection Paper Respondent – December 12, 2006)

Students stated that the use of blended learning environment motivated them in terms of voicing opinions. One student (Student C) stated that he was feeling more comfortable writing in forums, while it was hard for him to reply directly to peers. He further explained that it was easier for him to reply peers in F2F since it was a general response rather than individual to him. The students also mentioned real-world relevance of activities including guest seminars and course projects and learning different skills as the motivating issues of the blended course. Related statements included the followings:

Not only learning content, but rather put it into practice and voice my opinions freely without any constraint or any interruption provided me the opportunity to express myself correctly. This motivated me as the main feature of blended learning environment. (Survey Respondent)

I liked the way instructor introduced basic content. Moreover, the guests that the instructor invited to our class was very motivating… (Survey Respondent)

I was motivated to see how I could manage to learn the subject and create a real-like project. (Survey Respondent)

The most important thing that was a plus of course was seeing what people (person/firm) in my subject area were doing. Web environment was very adequate for this environment as well. (Survey Respondent)

… I always went each course with enthusiasm. There are courses that you go unwillingly. This was a course that I was participating willingly. (Student D)

… I think all of them [course activities] were helpful and I was very much motivated by the idea that these things that we covered in the course were things that we will experience in the future. (Student F)

… The things that I was recommending people to use [educational materials] were things that I was evaluating in the course. This was really a great opportunity. I recommend with plusses and minuses, but I know, I know the content, I know the interface, I know its usability features. This was really good… (Student H)

I had almost the same efficiency of learning in F2F environment when I immerse myself in the online environment. (Weekly Reflection Paper Respondent – November 28, 2006)

The invited guests gave us great information on reality. (Weekly Reflection Paper Respondent-December 5, 2006)

The opportunity to voice opinions more was an attribute of the course in using variety of activities to help students discuss within groups or as a class. These included F2F discussions within groups and online forum discussions again within groups where different students made summaries after each topic. Related quotes include:

> … I found the opportunity to voice my opinions. I could not actively participate F2F classes, but I used online environment. I could get experienced with the online web project processes… (Student B)

> …I can respond in online environment more comfortably. In F2F class, either there is time limitation or you just don't find what to say at that time… In fact I prefer F2F responding, but there is the comfort of writing online. You can write whatever you like. … Both provided opportunity for us to participate… (Student D)

> … Sometimes I came to class without getting prepared or without reading the assigned articles and therefore could not participate. But I could be able to participate in online forum. This is the plus of online to F2F. … But F2F has plus to online too. … Because having the opinion of a friend or instructor in F2F or seeing the mimics is enough to participate. (Student H)

> … You don't have to discuss and learn issues in F2F environment. You can share your ideas or find answers to your questions by using the online environment as well. (Survey Respondent)

Another enabler was time efficiency. Students could ask their questions without any time limitation whenever they needed and they could respond the same way. They could flexibly study the content of the course as well. This opportunity was mainly attributed to online environment, but it was more efficient for students when they could have the online environment support after F2F classes. Related quotes are as follows:

> … It [blended learning environment] saved time for us to study. … Additionally, instead of googling or searching elsewhere, we had quite many resources to study in online environment. It was advantageous in this way too. … (Student D)

> … There were guest speakers that we listened to their ideas in classes. You cannot interrupt his speech while he is talking even if you have a question. After the seminar, we could not have enough time to discuss issues together. … But in forum environment we discussed how we could improve our skills, how all those issues were related to our course or project, what lessons we learnt, etc… (Student H)

> … When it is only F2F course, the session is fixed there with no continuity. But when there is online environment after class sessions and a discussion topic is submitted, I can post my responses very comfortably. Additionally, we have a lot more time on the Internet. (Student I)

There was no time limitation in online environment and I could freely respond the way I wanted. (Survey Respondent-explanation for online participation as very active)

Reinforcement of learning was one of the most frequently mentioned enabler of the blended environment. Students pointed out the supporting role of F2F environment to online and vice versa for their learning and stated the opportunity of making more research. They also brought the benefits of several instructional strategies such as group works, quizzes, and projects. Related responses included:

…In online environment, I could reinforce the information that we gathered in F2F environment. … Initially it was hard for me to understand the storyboard and flowchart issues that were explained in online presentation, but I could understand better when guests explained how they made use of them and I remember them now very well. … (Student D)

… After the F2F classes where we learnt theoretical knowledge, I could be able to respond to forum environment as a student who knew the basic knowledge… (Student F)

We need to learn theoretical information. Only online environment is not sufficient to learn. … It is better to learn under the supervision of an instructor. … Class sessions are, more or less, a limited environment. But online environment is always there for you to serve you whether via the communication facility or the resources facility … We could use many resources to help us. We could think variety of thing in forum that we would not otherwise discuss in F2F environment. (Student G)

In F2F environment, you come to class and if you come prepared or with background information, you can talk on them. But in online environment, in terms of research, if I want to show 'I know this' or 'I have an idea on this issue', I need to make research. All of my peers were doing so too. I am pretty sure of this… This made us be more ready for F2F environment… (Student H)

The two environments were affecting each other in terms of reinforcing what I learnt. I think the F2F courses were more of a plus for basic information gathering. Online environment was more of an area for me to reinforce what I learnt… (Student I)

Sometimes I felt what we discussed in online environment just stayed there, which made it abstract. But when we discussed them F2F this problem was removed. (Survey Respondent)

[The most contributing activity to my learning was] The group work. I reinforce what I have learnt when I work in group. (Weekly Reflection Paper Respondent – October 3, 2006)

… sometimes time is not adequate to learn from online sources, I learn from F2F courses as well. (Weekly Reflection Paper Respondent – November 28, 2006)

One issue in terms of enablers on the part of the instructor was helping instructor better monitor students' progresses. That is, students felt that the blended learning environment provided them the opportunity to demonstrate their efforts for the course to the instructor. Related quotes included:

> …You feel like your responses are taken into consideration, or this forum environment is being tracked. Nevertheless I feel comfortable when someone responds to what I wrote there with the idea that someone is really reading them. … (Student A)

> In the blended learning environment, the instructor knows about us at least in terms of our names. Because, when we responded to online forum and she followed these responses, she learnt our progress better. (Student E)

One student (Student I) also remarked that she took the course more serious when it was in blended format. She explained the reasons as follows: "Because, in online environment, sometimes I paid less attention. When it is not F2F, I can neglect studying, but F2F makes it more disciplined".

Students also mentioned the opportunity to have more instructor support. The instructor actively participated to forum environment and this was mentioned in responses. Related quotes included:

> F2F classes were effective due to instructor support in content presentation. She was also motivating in forum environment to post more… (Survey Respondent)

> It was easier to receive feedback [due to blended learning environment]. (Survey Respondent)

> [The most contributing event] was the discussion environment in online environment and the feedback that we received. (Survey Respondent)

> She read everything on the forum posts. It was really good for this purpose: she gave feedback to all. When I wrote something she always responded sooner or later…. She was supportive in F2F discussions: she was always challenging us in discussions… (Student C)

> … Our instructor's support was really huge. … She was always trying to help and do her best whenever needed. When we saw her effort for us, we thought we needed to study more and more… (Student I)

Availability of resources for the wide access was another enabler mentioned by the students. They pointed out the features of online environment mostly regarding this issue, but they also mentioned the F2F environment on demonstration of software that could not be available online. These are the related quotes of the participants:

There was variety of resources in online environment. I especially liked the links for using my project purposes. (Survey Respondent)

[The most contributing event] was accessing resources in online environment whenever we needed and consequently no need to take notes in F2F classes…. (Survey Respondent)

The course instructor uploaded lots of e-sources and links. For example she uploaded 8-10 web addresses related to topic of the week, 'look at this link' or ' investigate this' etc. We loved them [links] a lot with my peers. Experiencing something is really better than just reading it. Links related to who did what on our subject, or sites including materials and resources. Maybe these were more helpful than having hours of lecturing. … In F2F lectures we investigated software and example projects and instructor did a great job in making comments on them with us. It would be impossible to do this in online environment… (Student H)

Having more area for discussion and interaction was another enabler mentioned by the respondents. Students clearly stated that they were very satisfied with the discussion opportunity and using both online and F2F environments supported this opportunity. It also allowed students to have more peer interaction. Related quoted were as follows:

The blended learning environment increased the interactivity of the course. With the online environment we could discuss whatever issues we wanted to discuss in forum and make use of e-sources… I could have feedback in F2F. (Survey Respondent)

… The course provided me to discuss issues with peers, either in online or in F2F class… (Survey Respondent)

I found the discussion environment [online forum] very supporting and beneficial. I could have immediate feedback, which was good. (Survey Respondent)

Definitely we could benefit from the enablers of F2F and online environments together. But I loved the immediate feedback that I took in F2F classes much better. (Survey Respondent)

[The most contributing event] was interacting in online environment by discussing issues together and having applications and activities in F2F environment which we would not do in online. It [blended learning environment] provides having these together in our course. (Survey Respondent)

… Peer-peer learning is sometimes better and in our course we could use of this very much. … In the class, we discussed issues with peers in groups, and there were class discussions and group discussions, separate [discussions for project groups] discussions in online. Absolutely richer interaction. (Student J)

The students remarked the continuity of the learning process due to the use of blended learning environment. It provided benefits on their learning with different perspectives. Here are the related quotations from participants:

> … When I used the online materials and resources before the F2F sessions, I could be able to have the maximum benefit from that specific course. … (Student F)

> … Sometimes, after F2F sessions I used to have a look at the ppt presentations or lecture notes in online environment or click to links and become lost while moving from one website to another. In following F2F session, I could have chance to talk and discuss on issues not because I have made the readings but because I read information on those links. This was really better for me. Most of my friends told the same. (Student H)

> With the blended learning environment, there was less lack of interaction and I could follow course content much more. … [The most contributed event to my learning was] having an online environment where we were provided with the same learning environment with F2F and having no lack of interest with this opportunity. (Survey Respondent)

It is also noteworthy to quote one student's comments on the F2F and online portions of the course to reveal the effects of these environments for the blended learning environment:

> I think F2F courses are always necessary. Every person has different characteristics and the negatives of these differences can be removed via interacting with others F2F. I do not think using only online environment can help doing this. … It [online environment] helped me in certain aspects for sure in such a learning environment with so many topics and people. (Weekly Reflection Paper Respondent – December 12, 2006)

### 4.2.3.1 Student Experiences on the Barriers to the Blended Learning Environment

The analysis of the quantitative data revealed that the students found the statements at neutral and disagree levels with the overall mean of 2.28 (Table 4.16). The major barrier for students was increased workload (37.5%, M=3.0) with the statements of "Having both F2F and online activities increased workload". The lowest mean score was for the item "Course instructor could not use the blended environment effectively" and was calculated as 1.89.

**Table 4.16** Student Responses to Possible Barriers of Blended Learning Environment

| Statements | | Strongly Disagree 1 | Disagree 2 | Neutral 3 | Agree 4 | Strongly Agree 5 | M | SD |
|---|---|---|---|---|---|---|---|---|
| Having both F2F and online activities increased workload. | f(%) n | 7.5 3 | 40.0 16 | 15.0 6 | 20.0 8 | 17.5 7 | 3.00 | 1.28 |
| I was not motivated for the course. | f (%) n | 10.0 4 | 47.5 19 | 15.0 6 | 22.5 9 | 5.0 2 | 2.65 | 1.09 |
| There was timing/time loss problem with the use of both environments. | f (%) n | 12.5 5 | 45.0 18 | 12.5 5 | 20.0 8 | 7.5 3 | 2.64 | 1.18 |
| F2F and online assessment did not support each other. | f (%) n | 12.5 5 | 47.5 19 | 25.0 10 | 7.5 3 | 5.0 2 | 2.43 | .99 |
| I did not have effective interaction or communication with my classmates. | f (%) n | 15.0 6 | 47.5 19 | 20.0 8 | 15.0 6 | 2.5 1 | 2.42 | 1.00 |
| Blended learning was not appropriate to course content. | f (%) n | 20.0 8 | 42.5 17 | 27.5 11 | 5.0 2 | 5.0 2 | 2.32 | 1.02 |
| The link between online and F2F portions of the course was not strong. | f (%) n | 17.5 7 | 50.0 20 | 15.0 6 | 17.5 7 | 0 0 | 2.32 | .97 |
| I did not receive timely feedback. | f (%) n | 20.0 8 | 55.0 22 | 10.0 4 | 10.0 4 | 5.0 2 | 2.25 | 1.05 |
| Course activities and materials were not rich. | f (%) n | 20.0 8 | 55.0 22 | 12.5 5 | 10.0 4 | 2.5 1 | 2.20 | .96 |
| F2F activities (discussions, expert seminars, group work) were not sufficient. | f (%) n | 20.0 8 | 57.5 23 | 7.5 3 | 15.0 6 | 0 0 | 2.17 | .93 |
| Online activities (forum discussions, assignments) were not sufficient. | f (%) n | 17.5 7 | 57.5 23 | 17.5 7 | 5.0 2 | 2.5 1 | 2.17 | .87 |
| I did not have effective interaction with the course content. | f (%) n | 22.5 9 | 50.0 20 | 17.5 7 | 7.5 3 | 2.5 1 | 2.17 | .95 |
| I did not receive sufficient feedback. | f (%) n | 20.0 8 | 57.5 23 | 10.0 4 | 12.5 5 | 0 0 | 2.15 | .89 |
| Blended learning is not appropriate to my learning style. | f (%) n | 17.5 7 | 60.0 24 | 15.0 6 | 7.5 3 | 0 17 | 2.12 | .79 |
| I had technical problems in online environment. | f (%) n | 30.0 12 | 42.5 17 | 12.5 5 | 10.0 4 | 2.5 1 | 2.10 | 1.04 |
| The technical support for the online environment was insufficient. | f (%) n | 25.0 10 | 57.5 23 | 5.0 2 | 10.0 4 | 2.5 1 | 2.07 | .97 |
| I did not have effective interaction or communication with the instructor. | f (%) n | 25.0 10 | 57.5 23 | 12.5 5 | 2.5 1 | 2.5 1 | 2.00 | .84 |
| Course instructor could not use the blended environment effectively. | f (%) n | 27.5 11 | 55.0 22 | 12.5 5 | 2.5 1 | 0 0 | 1.89 | .71 |
| **Overall** | | | | | | | **2.28** | |

The analysis of qualitative data revealed that the barriers of the learning environment that were mentioned by the students were specific to online and F2F portions of the learning environment as well as the blended environment. Therefore, the results were grouped into three major categories as it was done in the case of enablers: the barriers of online environment, the barriers of F2F environment, and the barriers of the blended learning environment. Barriers of the online environment included the misunderstandings in forum discussions, system log off, consistency in navigation, and cosmetic adequacy. The barriers of the F2F environment included too many new content presentation and crowded classroom size. Finally, the barriers of the blended learning environment which is the major concern of this study were increased workload; barriers emerged from course design and cultural concerns, and dependability of the environments to each other.

Barriers of the Online Environment

The participant responses showed that barriers of the online environment were related to its nature on communication and interaction as well as some technical features. One barrier mentioned by the students was the misunderstandings in the forum environment. They stated that in posts regarding comments on sample scenarios, some peers misunderstood the comments and wrote in the different direction. Example quotes include:

> … In forum environment I take things very serious at first. If you don't have a F2F contact with a peer, you may misunderstand her/his writings or may not be sure what she/he really meant. Sometimes, peers who are not in good relationship with you can write a thing in a daily mean, but you take it serious. Consequently, there are misunderstandings. … (Student A)

> …. There is an issue in forum: For example your peer wrote something, another two wrote on it, so it becomes hard for me to respond as one more response. It seems like you are coercing, therefore it is easier sometimes to respond F2F. (Student C)

> The online discussions were sometimes abstract and caused misunderstandings between peers…. (Survey Respondent)

Student D also mentioned the barrier he had on the technical feature of the online environment as being logged off after a certain time. He complained on this as " It is logging off in a very short time! If you don't use the system just one or two minutes, you are logged off! I think this is a big problem."

Technical capabilities required for the online environment was not too demanding for the students since they were advance Internet users and had many technical courses before attending this course. For this reason, students did not mention any difficulties in using the system, but there were several issues that bothered them. One thing was mentioned as lack of consistency in navigation. Although in the usability study the navigation issue was taken into consideration, it appeared to be problematic for Student H. She stated her experience as the following:

> … I had problem with the navigation. I am not sure if this is because I am not very used to or not, but I was very bad at moving through pages in links. If I need to go back for a level, I find myself back in three levels. This was very demotivating. I was again going forward two levels to find where I wanted. …

Final issue was remarked again by Student H. She complained on the cosmetic adequacy of the online environment. She expressed her concerns as the following when asked about the barriers she had in online environment:

> The interface. Maybe because we are students or advanced Internet-users, we are more used to colorful Websites. Let it be banners or links or colorful Websites. Necessarily, we are looking for eye-catching features. … Buttons, link etc could be more colorful or more visually appealing. …

One student also mentioned the distracting feature of online environment in the weekly reflection report on October 3: "There are lots of things in online environment that distracted my interest". This was an issue for him that made F2F environment more valuable to learn the content.

Barriers of the F2F Environment

The issues mentioned as the barriers of the F2F environment included the crowded class size and too much new content. The number of students taking the course was forty-six and this was a big class size for a F2F session. This reduced students' time for participation and made it difficult to participate efficiently. One survey respondent expressed her/his reason for participating F2F course as 'sometimes active participation' as having active participants of F2F course in enough amounts. Other students expressed the problems that they faced as the following:

> It was hard for me to concentrate the F2F lectures because of the crowd of our class. … It was making it boring. … (Student B)

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… I don't like everyone talking, some are discussing etc. When the class size is big, there is inevitable noise. It becomes hard to understand and catch what one is talking about. … (Student G)

… We could not have opportunity to participate always to F2F lecture due to crowd of the class. (Survey Respondent)

There was no problem except one: I was too far from the board and I could not see [the presentation screen] well. (Weekly Reflection Paper Respondent – October 3, 2006)

The course content was respected to be too much for students that they regarded this issue as a barrier in their experiences. Student D stated this issue "Sometimes theoretical part of F2F courses was boring. … [because] every time a new content was presented and there were mass of content to be learnt." Other concerns were centered on the time limitation for the F2F courses or too much F2F courses throughout the semester. Related responses were as the following:

The content was really too much for the course. I felt I was losing interest in following all the content. (Weekly Reflection Paper Respondent – October 3, 2006)

I think the course content is too much. I had difficulty to concentrate on the examples given and keep my interest throughout the rest of the presentation. (Weekly Reflection Paper Respondent – October 17, 2006)

Barriers of the Blended Learning Environment

The student responses on the barriers of the course environment were centered on workload issues, course design concerns, cultural issues, and dependability of one environment to the other. Each theme had variety of sub categories. A summary of the frequencies and percentages of the responses are given in Table 4.17.

**Table 4.17** Summary of Qualitative Responses to Barriers of Blended Learning Environment

| Themes | Perceived Barrier | Participants from | f | Out of | Total Interviewees | | Total Survey Respondent | | Total Reflec. Report Respondent | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | f | % | f | % | f | % |
| Workload issues | Having workload of two environments | Interviews Survey Reflection Report | 3 7 15 | 10 40 40 | | | | | | |
| | More time commitment | Interviews Survey Reflection Report | - 6 10 | 10 40 40 | 3 | 30.0 | 11 | 27.5 | 15 | 37.5 |
| Course design concerns | Activity design barriers | Interviews Survey Reflection Report | 1 2 11 | 10 40 40 | | | | | | |
| | Scheduling of activities | Interviews Survey Reflection Report | 2 - 1 | 10 40 40 | | | | | | |
| | | | | | 5 | 50.0 | 4 | 10.0 | 12 | 30.0 |
| | Staying on track on things to do | Interviews Survey Reflection Report | 1 1 2 | 10 40 40 | | | | | | |
| | Guidance for online environment | Interviews Survey Reflection Report | 3 2 2 | 10 40 40 | | | | | | |
| Cultural issues | Medium of language used | Interviews Survey Reflection Report | 2 - 2 | 10 40 40 | | | | | | |
| | Interaction and communication patterns of the students | Interviews Survey Reflection Report | 2 - - | 10 40 40 | | | | | | |
| | | | | | 5 | 50.0 | 8 | 20.0 | 10 | 25.0 |
| | Personal issues | Interviews Survey Reflection Report | 1 2 3 | 10 40 40 | | | | | | |
| | Technical issues | Interviews Survey Reflection Report | 4 6 8 | 10 40 40 | | | | | | |
| Dependability of one environment to the other | Online env. activities are related to F2F and vice versa | Interviews Survey Reflection Report | - 2 1 | 10 40 40 | - | - | 2 | 5.0 | 1 | 2.5 |

Workload was a major barrier mentioned by most participants. They complained that having workload in two environments made the course load more than a usual course. It was also termed as more time commitment as well. The weekly reflection reports revealed that at the midst of the semester (beginning from reports on November 7) students began complaining about the workload for getting hard for them.  Related items are as follows:

> … Courses workload was heavy. There were things both to write in online forum and also having F2F courses every week. Because as students we think like this: We have other courses too, they place workload on us too and we are having difficulty to manage them all. When we participate F2F, online is disregarded; or when we participate online, F2F is disregarded. … (Student G)

> It [blended learning environment] was taking our time very much and was increasing our workload. (Survey Respondent)

> It [blended learning environment] increased the workload. The course is a 3-credit course and apart from three hours of lecture time we had to participate the online environment. The forum was being graded. Then the course needs to be 4 credits…. (Survey Respondent)

> Considering the other courses in semester period, having activities in both environments increased the workload for the student. (Survey Respondent)

> Sometimes it increased the course workload. Using both online environment and participating F2F courses is really very difficult in busy periods of the semester. (Survey Respondent)

> It was sometimes hard for me to post to forums when I had examinations of other courses or had assignments to finish before due data. (Survey Respondent)

> The workload is getting too much nowadays. Since the end of semester is approaching we have lots of deadlines and tasks. Having F2F course every week is making things harder for me. (Weekly Reflection Paper Respondent – December 5, 2006)

> This week the workload was too much. I responded to forum environment, met with group members for the evaluation of educational software CD twice, then made a meeting for project and project report. Considering the other course assignments and midterms the workload becomes too much in total. (Weekly Reflection Paper Respondent – December 12, 2006)

Related to activity design barriers, the students complained about the amount of assignments and readings to be too much for a blended course. For a blended course, the activities needed to be balanced and the amount needed to be reconsidered when compared to a single environment. There was always concern given to crowd of the F2F

class as a barrier to their learning in weekly reflection reports. One survey respondent also notified the issue. Moreover, the scheduling of activities need to be taken into more consideration for the balancing of the workload and staying on track on things to do. Several students also noted the problems they had in online environment including forum content and upload of documents, which can be attributed to lack of guidance. The responses were as the following:

> At the beginning of the semester, we were not very well informed on what we were supposed to for the project and how things were going to take place in online and F2F portions of the course. (Student A)

> I always felt the need to get online for the forum. Because, there was always the chance of a new forum topic discussion be held. I always felt worry on this concern. (Student B)

> … I notice something on the [Web] page. [Mimic on friends' talk:] Dude, I saw something: hey where did you see it. Things happened like that. Where [in which pages] did she [course instructor] insert that note? Sometimes it was confusing [to track online]. (Student D)

> There were too many documents [both in F2F and online environments] that we were supposed to read. … (Student F)

> … We don't have concrete experience on that [forum topics]. It is hard to say I can do this or that. In previous [blended course] we wrote our experiences on the forum and we had more evident arguments. (Student G)

> … There were too many assignments. I felt it was too much considering the workload that we had in online environment plus F2F assignments. (Survey Respondent)

> The assigned readings are increasing and I think they are too much. We are also doing lots of assignments. (Weekly Reflection Paper Respondent – November 7, 2006)

> [To the instructor:] We already have lots of courses, assignments, and projects. You assigned another one this week and I do not know how to handle them all. (Weekly Reflection Paper Respondent – November 7, 2006)

> There can be no such a mention of workload this week! Already it is close to the end of semester. We cannot find time to study our projects because we have lectures to participate. It would be better if had no F2F lecture next week. (Weekly Reflection Paper Respondent – November 28, 2006)

It is also noteworthy to include a student's concern for the course here. The student is a survey respondent and wrote that he/she was very uncomfortable about the participation being necessary for the course. The note is as follows:

> Personally I don't like having and doing things as required. The things that we had to do in the context of this course might be the reason for me to have developed negative perspective to the course. Consequently, if the online environment had been used as free-time environment, it would be better. …

The barriers that can be attributed to the culture of the general learning environment of the study context emerged from the medium of language used, interaction and communication patterns of the students, and personal issues of students. The medium of instruction in the university of the course is English and there were international students in the class. Related quotes are as follow:

> … I had a great language problem. I should not post my ideas in English. If I do so, then it will look very simple and superficial. Thinking what this [the word] is and what the other is, I can write only two or three sentences. I say 'yes it is true, I agree' and that is all… When it is Turkish, it is more effective for me. It is really hard to discuss issues in English [because] I don't sometimes understand what my peers meant. … It is not easy to express your ideas in English for me. If it is Turkish, two-hour course can be better understood in 30 minutes. … (Student C)

> I need to be all ears not to miss things presented in class when it is English. But it is more comfortable when it is Turkish… There are some words we don't even know the meaning in presentations and it is hard to understand then. … (Student D)

> I had communication problems with my project partners. They were always late to our project meetings. I really don't know the reason. I was always waiting for them for meeting. (Student E)

> … Since I am working in private sector, I was coming home very late. [Therefore] I did not use online environment much. (Survey Respondent)

> I could not always find chance to get online. This prevented me be active in online environment. (Survey Respondent)

> I do not understand the meaning of several terms in English. When I am stuck with the words, it is hard for me to concentrate on the rest of the presentations. (Weekly Reflection Paper Respondent – October 17, 2006)

Student projects were among the most important activities of the course. These projects were sample ID project developments and required students to select a K-12 course topic and develop a CAI material for that topic. Several students stated that it was very hard them to develop the material due to their lack of technical knowledge that was necessary for their aims. What is meant by technical here is the programming language knowledge necessary to develop material on the computer. The problem can be attributed to the lack

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of technical support for students for the blended course since it made the course too much demanding. Students stated their complaints as follows:

> We will develop a CAI material, but we did not have background information on programming languages or programs to do our project. We did not know coding, we did not know Flash program, meaning we did not know much. We had to learn about these programs first to develop our project and this took a lot of time for us. … We learn about the theory, but we need to develop something and this is not via cartoons or papers but coding. There was not any support for programming. This was very challenging for all…. (Student C)

> … There are a lot of ideas in our minds to develop, but we don't know how to develop them. We can produce many good ideas but in terms of ideas, not technically. (Student D)

> [The most difficult thing was] project that we completed at the end of the semester. There was no one who knew any one programming languages fully to develop our plans. (Student F)

> We learnt the pedagogical knowledge very well and the related terminology and issues that were critical. Okay, I know the features that I need to incorporate to the program and I learnt the critical pedagogical issues, but doing it technically was all up to us and we had limited knowledge… If I did not have a peer in our group who knew technical issues, I would not be able to develop such a project. … (Student I)

> It would better if we were presented or demonstrated the background information on how these programs [games as the content of the week] were developed or what technical features they had. (Weekly Reflection Paper Respondent – October 17, 2006)

> The most important problem I had in this week was not knowing the Flash program that we will be using for our project. It has put a lot of burden. (Weekly Reflection Paper Respondent – December 12, 2006)

Finally, dependability of one environment to the other was regarded as a barrier in the course since students regarded success in one environment was dependent on the other and they found this situation as a difficult experience. Related quotes are as follows:

> If I had problems to use the online environment for a week, that meant I could not have chance to make that week's assignments and discussions. When I had an important task to do for another course, I could not have chance to use the Internet at all and for that reason I was not able to actively participate the F2F course in that particular week. (Survey Respondent)

> If you do not understand the subject presented in F2F environment, then that means you will have difficulty in put the online activities into practice. (Survey Respondent)

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**4.2.3.1 Student Perceptions on the Necessary Conditions for Blended Learning Environment**

Students were asked what conditions there needed to be in order to use a blended learning environment in an open-ended item of the survey. The responses were centered among four main categories: physical components, course design issues, context of the course, and instructor and student willingness. A summary of the responses are given in Table 4.18.

**Table 4.18** Summary of Survey Responses to Necessary Conditions to Blended Learning Environment

| Themes | Conditions | f | % |
|---|---|---|---|
| Physical components | Equipment supply | 23 | 57.5 |
| | Technical support | 5 | 12.5 |
| | Usable online environment | 4 | 10.0 |
| | Appropriate classroom setting | 3 | 7.5 |
| | Allocation of resources and documents | 1 | 2.5 |
| Course design issues | Student motivation | 4 | 10.0 |
| | Active student participation | 3 | 7.5 |
| | A sharing and interactive environment | 2 | 5.0 |
| | F2F and online portions support each other | 3 | 7.5 |
| Context of the course | Student background knowledge and competency on using a blended learning environment | 14 | 35.0 |
| | Appropriate course content | 10 | 25.0 |
| Student and instructor willingness | Willingness of student on the participation to the course | 2 | 5.0 |
| | Instructor willingness and competence in using the environment | 6 | 15.0 |

Regarding physical components, students mentioned the needs for equipment (n=23), technical support (n=5), usable online environment (n=4), appropriate classroom setting (n=3), and allocation of resources and documents (n=1). The need for equipment was the most frequently expressed issue for a blended course since it was necessary for the online portion of the course and not everybody has the availability to use the online environment in a course context. Technical support was another need for the online environment to

maintain a learning environment that functions properly. Regarding the usability of online system, students articulated the need for an eye-catching and appealing online course environment. One student also noted the importance of "updating and tracking the online environment". There were also issues students declared for the F2F environment. As it was important for online environment, it was also important for F2F environment to have an appropriate design in terms of physical adequacy. The final issue was allocation of resources and documents. The student highlighted this concern by stating "Blended courses need to be supported with a lot of resources and documents on the course."

Related to course design considerations, students remarked the need for making students motivated for the course (n=4), making them actively participate the course (n=3), and creating a sharing and interactive environment (n=2) where F2F and online portions support each other (n=3). Motivation was a critical consideration that needed to be integrated to the pedagogical approach. Students in the interviews mentioned on motivation as a critical component of the course in terms of arousing interest via interesting course materials, links, seminars, and sample programs demonstrations (Student A, Student C, Student D, Student E, Student H, and Student I), providing instant feedback from instructor and peers (Student A, Student D, Student F, Student G, Student H, and Student I), relating activities with real life via expert seminars and authentic projects (all student interviewees), and tracking their progresses via logs, forum, quizzes, and attendance sheets (Student A, Student E, Student H, and Student I). Another consideration was acknowledged as enhancing students' active participation via appropriate strategies. Final concern was the creation of an environment which enhances information sharing and allows interaction among students, instructor, and content.

It was an interesting finding that most students articulated the need for students to have necessary background knowledge and competency on using a blended learning environment (n=14) and the need for the course content be appropriate to a blended learning design (n=10) related to context of the course. Survey respondents described these students with different labels such as "quality students", "knowledgeable students", "deliberate students", or "computer-literate students". For the course content appropriateness, students commented that not every course is appropriate due to its content. One survey respondent give an example for this: "… For example Calculus can be offered only F2F." This was an issue that most student interviewees also asserted as an

important consideration. Here are several quotations from participants' data as explanations of their perceptions:

> It [blended learning environment] may not be used in every course, no it cannot be used. … In courses other than our departmental courses like physics or mathematics, it seems inappropriate to use blended environment. … [because] You need to have only F2F environment to learn these courses. It is hard to understand using online sources…. (Student A)

> It is not possible to use it [blended learning environment] in some other courses. For example: biology. It is a theoretical course. It is inappropriate for this course…. In mathematics course, for example, there is the limitation of unavailability of discussing issues. … You can only ask questions, nothing else. That is it is [using blended learning environment] something impossible for some courses. (Student B)

> ... It [use of blended learning environment] can be in project-based courses. ... The other courses like physics or mathematics, it is impossible to use blended learning environment. [Because] Things to do are already bounded. Things instructor will ask and resources he/she will give is bounded and known. There is a textbook. The instructor presents the content. It has no meaning to discuss issues online in a mathematics course…. (Student G)

The final issue was willingness of students and instructor to blended environment. Two students expressed concern for the willingness of student on the participation to the course. The other concern was for the instructor role described as her/his willingness and competence in using the environment (n=6). Students stated that instructor role was very critical to the blended course for its "productivity" and "effectiveness". Several student interviewees also adduced their interest to course as instructor willingness and effort in the course. Their responses were as follows:

> It was very engaging to course instructor being online more than us! We were feeling that our every effort was assessed /seen by the course instructor. … That means she was reading, she was taking into account whatever we wrote there…. (Student H)

> … Course instructor did her best for us. Seeing her in this effort made us feel like 'we need to do more'. … Nothing we posted was staying there. Our progress was tracked [by the instructor]… That is, her role was very helpful. (Student I)

## 4.3 Theme III: Critical Issues to the Use of Blended Learning Environment

The processes beginning from the analysis to the end of the implementation period engaged the course instructor into a great many experiences. The implementation period also involved students as the main actors of the environment and placed a lot of new experiences for them as well. The analysis of all data during these processes gathered from her own, peers, and students enabled the researcher to identify the issues of course design that were critical to the use of the blended learning environment. Therefore, these issues were synthesized from the overall results and included the context comprised of curricular and institutional issues, pedagogical issues, instructor competency issues, and technical issues. A summary for m of the results is given in Table 4.19.

### 4.3.1 Context

Consideration on the content and context of the course were imperative for determining approaches and logistics in the creation and implementation of a blended learning environment. The content of the course can be labeled under the curricular issues while the other logistics of the course was regarded as a concern of institutional and administrative issues.

The curricular issue included the course activities and assignments in relation to course content. Students mentioned about course content regarding the appropriateness to a blended learning design. Only two students raised concern on the use of blended learning for any course. Related quotes as examples from data are as the following:

> I believe using blended learning environments for courses like this is very much suitable… and beneficial. … It saves time for what instructor wants to mention, for [providing] any assignment, or resource and link. … If it was not in blended environment, we would not be this successful in projects… It seems it unsuitable for our non-departmental courses like calculus, physics [since] you need to learn them F2F … you may not understand the issues online. It requires advanced online technologies for the online. Will you be able to interrupt the instructor when he is giving lecture online? F2F is easier for such courses. (Student A)

> Use of blended learning environment is very appropriate for the course [CEIT209]. … Because it addresses more students like me. … I don't participate F2F classes [but use online forum to participate]. … But you cannot use this format for certain courses. Biology, for example, is all theoretical information. For example in calculus there is the risk of not discussing issues, which means no

practical instruction. You cannot discuss it. You can only find mathematical questions and answers, nothing else. That is, it seems impossible to use blended learning for certain courses. (Student B)

… I tried earlier to use online physics courses at home. But it seemed so irrelevant. Soon I began not using it at all. I explored many videos or tools, then gave up. It is not possible to use web in all courses. (Student C)

This course should be continued in this format [blended learning]. In courses like computer-based, technology based or the like, blended format needs to be used. Moreover, the online part must be used more… (Student H)

**Table 4.19** Summary of the Findings on Course Design Issues Critical to the Use of Blended Learning Environment

| Themes | Issues |
|---|---|
| Context | Curricular issues<br>• Content of the course<br>• Course activities and context<br><br>Institutional and administrative issues<br>• Support on logistics<br>• Management of learning environment<br>• Technical support |
| The pedagogical framework | The instructional aims and scope<br><br>The approaches of the course activities<br><br>Portions of online and F2F environments<br><br>The context of activities<br><br>Instructor and student role<br><br>Motivation<br><br>Harmony of online and F2F environment<br>• Interaction<br>• Communication<br>• Cooperation |
| Instructor competency | Prior knowledge on content<br><br>Competency in technology use<br><br>Time management skills<br><br>Management skills |
| Technical issues | Technical availabilities<br><br>Usability<br><br>Maintenance |

This was a parallel argument in the instructor diaries as well, which suggested the notion that the course content needs to be appropriate to use the online environment. For the

appropriateness, peers had different perspectives. While Peer A suggested the appropriateness of the course content, Peer B mentioned the use of different approaches for any course to use a blended learning environment. Related quotes included:

> …The last year's experience with the course has helped me to be aware of the context from both participants' and content sides. My initial concern is about the course content. I tried to remember the subject matter from all perspectives, therefore I revised my materials, readings, books, assignments, etc. that I used last year... (Instructor Diary on August 14)

> … The content of the course requires both knowledge and skills development [which were regarded necessary considerations in online and F2F portions]… (Instructor Notes for Analysis)

> The course has these features that necessitated a blended learning environment: First, the course content is technology-based. The students have a certain competency of computer use, at least in intermediate level. Second, course is project-based with a lot of assignments. To carry out all of them properly there is a need for more peer-review. If we consider these concerns, I think blended learning is appropriate to use. Being project-based, the necessity to discuss projects among group members, heavy load of assignments, plus, in a field related to technology and hence unavailability of being able to demonstrate examples in class… I can say that it is a mistake to offer this course only online or F2F. (Peer A)

> Specific to this course, I found these functions [using online forum and adapting F2F course accordingly] enabled a plus to course [for communication and interaction]… For other courses it can be like this: For calculus Web can be used for practice where questions are posted and maybe a recitation hour with TAs. For physics, a place for problem solving or simulations for experiments. That is, what that course needs, what the content and the students need determine the need for blended learning environment. (Peer B)

> The institutional and administrative concerns included considerations on support in logistics to design and implement the blended learning environment with a main focus on online environment, management of learning environment, and technical support issues again related to online environment. The instructor data showed that the instructor needed support in the design, development, and implementation of the online environment a lot. The institution of the instructor provided the technical support during implementation, which were necessary, but not adequate for a single instructor. Related to this issue, peers expressed concern that the instructor needed to have technical support and study in a team including multiple instructors or TAs.

> This week, I uploaded many of documents to online environment. Only a few are left (links and some online documents). The videos will be uploaded after the in-class sessions. I also did not complete forum environment, because I need to add my students to the environment first. (September 23)

I was extremely difficult to upload documents this week because there was a timing problem in assignment dues. Thankfully I asked [name preserved for the technical support team member] to fix the problem. There was a trick to overcome the problem, however, it still challenges me each time I try to upload document! (Instructor notes with no date given)

It took a lot of time for me to upload documents to the webpage. (November 7)

I would suggest having help from more experienced instructors or institutions professionally conducting such courses. … TAs could be more active in online environment. … (Peer C)

### 4.3.2 Pedagogical Issues

Pedagogical framework chosen for the design of the learning environment was determinant for many dynamics of the course design, development, and implementation for the instructor. By using Merrill's First Principles of Instruction as a framework, she designed the approaches of the course activities and course environment. Instructional strategies to use, support mechanisms for interaction, motivation, and facilitation, and other course related processes were all dependent on the pedagogical framework.

> I want my students be very active throughout all semester. Therefore, my strategies should match in online and F2F environments to fulfill this aim. Since this is the core of my pedagogical approach, I will apply the first principles, which I believe fits the needs of the course content within this context… (August 16)

The pedagogical framework supported considerations that were in line with the aims and scope of the course. They were determined in the instructor notes as the following:

> This course aims to introduce historical background and development of computer aided instruction (CAI), and the various concepts associated with CAI including common formats and evaluation principles used in computer aided instruction including drill and practice programs, tutorials, simulations, educational games, and demonstrations, and provide students with hands-on experience with related topic to put into practice.
>
> Students are encouraged to
>
> - express the basic concepts associated with CAI,
> - describe the historical background and development of CAI
> - identify the purpose, advantages, disadvantages of CAI,
> - describe the current formats and status of CAI
> - identify different types of CAI applications
> - comprehend characteristics of common CAI applications
> - evaluate the educational models, paradigms, and learning theories that will be used as a foundation for CAI

- list and explain general design principles
- be familiar with state-of-the-art design and implementation techniques
- identify the five stages of instructional design process and their key activities
- explain the importance of preparing a manual and documentation for educational software
- list the features of a good manual and documentation
- evaluate web-based design to assist with the development of an effective design for computer-aided instruction
- explain types of evaluation in CAI applications
- differentiate between formative and summative evaluation
- comprehend the assessment criteria for educational software evaluation
- evaluate different types of CAI applications
- work and solve problems effectively in teams and independently
- express oneself and share readings and thoughts through class discussions
- express oneself and share readings and thoughts through online discussions
- present findings and thoughts in an articulate, clear, and intelligible way orally, in writing, and using a presentation tool

As described in the considerations section, the pedagogical framework also enhanced the instructor select the approaches of course activities, determine the context of the activities, instructor and student roles, and motivational concerns as well as harmony of online and F2F environment. As an example, instructor notes on the activities design included her concerns on student and instructor role for the following strategies:

> … I plan to use the following strategies:
>
> - Using direct instruction and presentation methods in class sessions…
> - Employing group discussions and cooperative learning tasks in class...
> - Assigning homework in which they can make searches on the given information…
> - Engaging them [students] into discussions in online environments. My initial strategy for this will be dividing the whole class into 5-6 main groups to make discussions in separate divisions, and assigning one student from each division to summarize the discussions each week…
> - Providing online links to useful sites, online useful documents, and course videos for remediation…
> - Creating forum threads and subjects and moderating them. I will be facilitating the posts and will respond like a student, but let mostly students to respond…
> - Not sure of chat use..
> - Arrange expert seminars and online participation…

Pedagogical approach also impacted instructor's decisions on the portions of the course for online and F2F environments. This seemed critical for the general layout of the course design. For example, she used F2F environment for presenting the theoretical information, while online environment served mostly as an area where related discussions were held. Peer B placed concern as the following:

> In this course, moving discussions to online saved time for F2F course and enabled F2F activities work smoothly. … (Peer B)

### 4.3.3 Instructor Competency Issues

Instructor competencies became another issue in the design of blended learning environment. The instructor needed to be knowledgeable on content, competent on technology use, time management, and classroom and online management. Students mostly attributed instructor role to be a facilitator in online environment and although guiding and allowing group works, mostly to be a traditional course instructor role in F2F environment. Related quotes include:

> In [F2F] class, she was theoretically presenting the content and trying to involve students to actively participate as much as possible… In online environment, she was very active…. (Student A)

> She was asking questions to make us to participate to the course [in F2F]. … In online environment, she was guiding us. (Student B)

> In classroom environment, we had discussions, in which the instructor guided or sparked our interest by challenging us. She also enhanced group work in the same manner. … She was reading and responding to all forum posts, which was great. She gave feedback for every post. It could be understood that she read them all and respond earlier or later. (Student C)

> She was a usual instructor in the class. In web environment, she was forum coordinator and made announcements. … (Student E)

> She presented content in [F2F] class. … In online environment she uploaded documents and resources that she used or could not be able to demonstrate in class due to time limitation. In forum she aroused our interest by creating discussion topics. (Student F)

> In F2F environment, she is an instructor guiding and making activities. … She had more roles in online environment. Not every student wants to participate to forum. There is a need for encouragement, or stimulation. She had a great role in the online environment. (Student G)

Peers expressed opinion on the instructor competencies with a focus on the dimensions of F2F classroom needs and online environment features. Peer B, for example, placed emphasis on the necessities of the F2F and online environments regarding instructor role by stating:

> … Due to its very nature, in F2F environment she had to be a [classic] instructor. Presenting content, giving examples, asking questions, guiding discussions [etc]... In forum environment or in online sections that needs her management, she needs to have similar and different roles. That is, it is not students who upload the documents, it is instructor who uploads or makes announcements. It is of course instructor who does them. …But there is the difference between online and F2F as this: In F2F environment, everything is at instructor hands, she explains, asks questions if she has any, gives examples and leaves. But in online environment, she tells students the discussion topic or this is the scenario of the week, asks what they think on the scenario. Then students continue everything. If there is a need for motivating them, instructor can interrupt… It is the communication area where instructor initiate activities and students continue.

When asked about the instructor role, Peer A mentioned about the overlaps that needed to be avoided. He expressed concern also for having repertoire and technology use as the following:

> Instructors who will use blended learning environments need to be cautious about overlaps. Same things should not be repeated in both F2F and online. Activities can support each other or can inform each other, but should not repeat each other. This sometimes happened in the course in terms of discussions. … The instructor needs to be expert in all dimensions. One, he/she needs to be expert/experienced in teaching and two, he/she needs to be expert/experienced in using blended environments. She needs to follow a semi-structured design pattern and allocate a lot of time. And most of all, he/she needs to be competent/knowledgeable on his/her content area, he/she needs to know the course he/she offered very well. Because in both environments, you face problems and you need to have in-depth knowledge to satisfy students and use appropriate media and technology to meet the requirements.

As mentioned by the Peer A, the instructor needed to be competent on technology use in terms of media use in classroom as well as LMS use. Instructor notes revealed that she needed to fix technical problems and be competent in using the online environment. For example, she needed to arrange due dates in forum environment and manage to disallow student posting after due date, for which she needed to spend a lot of time to learn how to do it.

Time management skill was another greatly important issue that was found to be critical by the instructor. The time need was mentioned by Peer C with the following statement:

Naturally, there is a need to devote a lot of time for the course. Since the course needed update information, the instructor needed to manage both online and F2F environments by controlling the environment. She needs to provide feedback all the time, answer their questions, etc. It can be easy for this course, but it can be a lot of work when offering multiple blended courses. … For inexperienced or novice instructors, it is really hard, it is like dedicate all your time to these courses. I guess there is a lot of time needed.

Finally, as a specification of the blended learning environment, the instructor needed to be competent on both classroom and online environment management. This was mentioned as a matter of experience by peers B and C. Regarding this issue, Student H expressed concern for the ideal instructor role for her in F2F environment as the following:

We [students] are used to traditional classroom environment. What we are expecting from the instructor is that he/she needs to be very good at classroom management. Although we don't like strict instructors, we do need classroom discipline. In places, I may be able to voice opinions, in places instructor should provide direct instruction. There must be a good atmosphere in which I can express my opinions. … The more you participate, the more you learn. Therefore, I think the instructor role then must support the creation of such a balanced environment. …

Based on her experiences, Student H described the roles that instructor needed to have in online environment by stating:

Online environment is perceived as a place without instructor. It is not absolutely like this. This is a footnote: what students mostly expect from the instructor is 'am I being tracked?' Am I monitored by the instructor? Does she get online as much as I do? Does she read my posts? We do expect these concerns. … It was encouraging to see the instructor get online more than us. What we do and write is being monitored by her. She spent this much of time for managing the website, for managing our posts. …When I ask question in online environment and don't receive answer after 2 hours, I really get upset. It [having immediate feedback] is really important in terms of instructor role as well. …

### 4.3.4 Technical Issues

The technical issues were mostly mentioned for the online learning environment features. These included the technical availabilities important for the instructor during course development and implementation processes and the usability of the web site before the implementation period. Maintenance of the system was an issue for the implementation process. Related quotes included the followings:

I need to learn how to technically create a thread for each group and prevent other groups to access it… (Instructor Diary, September 21)

I will now upload the ppt document and revise the related links and e-sources. Then I will create a thread on guest speakers. … (Instructor Diary, December 5)

… She [the instructor] continuously needed to update, improve, manage, and organize the online environment. For this purpose, she needed to provide the technical support too and this is a very difficult task indeed. She needs to maintain the use of the online environment without any interruption. (Peer B)

… I had problem with the navigation. I am not sure if this is because I am not very used to or not, but I was very bad at moving through pages in links. If I need to go back for a level, I find myself back in three levels. This was very demotivating. (Student H)

**Summary**

This section includes a brief summary of the study results based on the research questions sought. The summary of the findings are listed below.

**Research Question 1:** What are the instructor's experiences while designing a course in a blended learning environment?

a.　　What are the considerations during analysis?

    i.　　Analysis on Needs:

- Needs on pedagogical approach: need for an improved pedagogy that integrates both student and instructor centered approaches, enhances support mechanisms for instructor, peer, and expert; and involves group work and authentic activities

- Needs on course organization: Need for a course organization that involves rich activities, supports demonstration of examples and materials, and sharing of resources together

- Needs on interaction: Need on supporting more student-student, student-instructor, student-TA, and student-content interaction

- Needs on instructor role: Needs on tracking student progress and equipping them with necessary resources and demonstrations (due to time limits and big classroom size)

- Needs on student role: Need for more active student involvement and participation

    ii.　　Analysis on Context:

- Analysis of student characteristics: gender, age, proficiency of technical skills, background knowledge

- Analysis of course content: curricular issues, nature of content)

- Analysis of technical/technological issues (technical and technological availabilities and capabilities of the online system, usability issues, management of the online environment)

b.  What are the considerations during design and development?

- Pedagogical approach: Selection of pedagogical framework (Merrill's first principles of instruction), authentic activities

- Course materials and documents: The need for course document creation both for online and F2F environments, upload and organization of online documents, and development of F2F presentations, handouts, and hands-on materials

- Course organization: Balance of activities for F2F and online environment, communication of the technical features of the online system to students, and the proportion of time to be devoted to each environment

- Interaction support: Enrichment of all types of interaction (student-student, student-instructor, and student-content, student-expert interaction) with the joint use of online and F2F environments

- Instructor and student roles: Instructor role has not changed in F2F environment in moving from F2F to blended format, but the student roles expanded into a more active one

c.  What are the enablers of the use of blended learning environment during implementation?

- Arousing student interest and participation potentially more

- Having flexibility

- Saving time for certain course activities

- Tracking student progress more easily

- Increased interaction, collaboration and communication opportunities

d.  What are the barriers of the use of blended learning environment during implementation?

- Increased workload

- Difficulties related to the course and time management

- Overlaps

- Barriers in creating harmony among F2F and online environments.

**Research Question 2:** What are the students' perceptions of the enablers and barriers to learning within a blended learning environment?

a.  What are the students' perceptions of the enablers to learning in blended learning environment?

    i.  Quantitative Results:

- Students agreed or strongly agreed with the following items:

    o "I had effective interaction and communication with the course instructor." (82.5%, M=4.22)

    o "I developed different perspectives via working on variety of resources to complete assignments and project" (82.5%, M=4.20)

    o "Course instructor efficiently used the blended learning environment."(87.5%, M=4.17)

    o "The course provided opportunity to contribute to course activities (projects, assignments, etc) on my own." (85.0%, M=4.15)

- The lowest mean was for the item "My interests and preferences were taken into considerations in course design" with a mean of 3.25.

- The overall mean for all items was 3.87 denoting an agree level.

    ii.  Qualitative Results:

- Facilitation of different environments to catch all points of course content: having more engagement with course content, helpful in clarifying confusions, catch things that was missed

- Increased motivation: be able to voice opinions, real-world relevance of activities, learning different skills

- Opportunity to voice opinions and see others' opinions more: use of activities to help students discuss within groups or as a class, provide area for discussion both F2F and online

- Time efficiency: ask questions without any time limitation, flexibly study the content of the course

- Reinforcement of learning: F2F supported online and vice versa, benefits of instructional strategies such as group works, quizzes, and projects

- Better instructor monitor on student progress: opportunity to demonstrate student efforts to the instructor

- More serious course attitude

- More instructor support: active participation of instructor to learning environment

- Wide access to resources: both F2F and online access

- Continuity in course: learning with diverse perspectives

- Providing more area for discussion: discussion opportunity in online and F2F, more peer interaction

b. What are the students' perceptions of the barriers to learning in blended learning environment?

   i. Quantitative Results:

- The analysis of the quantitative data revealed that the students found the statements at neutral and disagree levels with the overall mean of 2.28.

- The major barrier for students was increased workload (37.5%, M=3.0) with the statements of "Having both F2F and online activities increased workload".

- The lowest mean score was for the item "Course instructor could not use the blended environment effectively" and was calculated as 1.89.

   ii. Qualitative Results:

- Increased workload: having workload of two environments, more time commitment

- Barriers emerged from course design: activity design barriers, scheduling of activities, staying on track on things to do, guidance for online environment

- Barriers emerged from cultural and technical concerns: medium of language used, interaction and communication patterns of the students, personal issues, technical issues

- Dependability of the environments to each other: online environment activities are related to F2F and vice versa.

c. What are the students' perceptions of the necessary conditions for learning in blended learning environments?

- Physical components: equipment supply, technical support, usable online environment, appropriate classroom setting, allocation of resources and documents

- Course design issues: student motivation, active student participation, a sharing and interactive environment, F2F and online portions support of each other
- Context of the course: student background knowledge and competency on using a blended learning environment, appropriate course content
- Instructor and student willingness: willingness of students on the participation to the course, instructor willingness and competence in using the environment

**Research Question 3:** What are the critical issues to the use of blended learning environment?

- Context:
  o Curricular issues: content of the course, course activities and context
  o Institutional and administrative issues: support on logistics, management of learning environment, technical support
- Pedagogical framework:
  o Instructional aims and scope
  o Approaches for the course activities
  o Portions of online and F2F environments
  o Context of the activities
  o Instructor and student roles
  o Motivation
  o Harmony of online and F2F environment: interaction, communication, cooperation
- Instructor competency:
  o Prior knowledge on content
  o Competency in technology use
  o Time management skills
  o Management skills
- Technical Issues:
  o Technical availabilities
  o Usability of online system

# CHAPTER 5

# DISCUSSION, CONCLUSION, AND IMPLICATIONS

This study was an attempt to investigate and describe student and instructor experiences and their perceptions of course design regarding the use of blended learning environment in a higher education setting. The first research question investigated the instructor experiences on the analysis, design and development, and implementation of the blended learning environment. The second question investigated how students perceived their experiences on the enablers and barriers of the blended learning course implementation. Based on participants' experiences and perceptions, the final question sought information for the critical issues to the use of blended learning environment. In this final chapter, the findings are discussed and related implications and conclusion are presented. At the final section, suggestions for practice and future research are offered.

## 5.1 General Discussion on Results and Implications

### 5.1.1 Instructor Experiences on the Analysis, Design, and Development

The findings of the instructor experiences indicated that before the design and development of the blended learning environment, the analysis considerations centered on the analysis of the needs of the F2F format for a shift to blended one and covered the phase of usability of the online environment and a pilot study. It is of important concern to note that these processes did not proceed in a linear path in all processes, but had iterations in a spiral manner. Related findings are discussed in the following sub-sections.

### 5.1.1.1 Issues on Analysis

The results of the analysis period yielded two major implications to determine for the design and development of the blended learning environment: the analysis of the needs

and the analysis of the course context. The needs of the F2F course in moving to a blended format were grouped into five categories: basic pedagogical approach, course organization, interaction, instructor role, and student role. The identification of these needs was regarded as the main issue of analysis process. Vrasidas and McIsaac (2000) suggested this concern as "do not minimize the front-end analysis phase" (p. 109) for their online course decisions. The analyses of the course context centered on issues of student characteristics, course content, and technical/technological issues. These considerations can be considered parallel to Tyler (1949)'s basic curriculum framework rooted on considering content, and learning experiences to be used and their organization, and evaluation of the program when planning instruction in a learning environment. Rooted in behaviorist tradition, these considerations also lay at the very initial stages of many ISD models (e.g. Dick & Carey model, Smith & Ragan model). Dick and Carey model, for example, included the analysis of instructional goals, entry behaviors, learners, and context as well as needs assessment with systems approach (Dick et al., 2001). Smith and Ragan (2005) model begins with analyzing learning contexts, learners, and learning tasks and includes the writing of assessment items. Romiszowski (1981) approached issue as a problem solving issue in a systems approach, in which the initial phase begins with defining of the problem whether be instructional or performance, and then moves to analysis of problem and selecting solution. It can be argued that the course instructor did not place emphasis for evaluation part but always had concerns about it during the implementation period, which reveals the importance of analysis of assessment procedures at the very beginnings of a blended learning environment. Focus on technical/technological issues was also a remarkable result of this study. Dick et al. (2001) argued that "it is the analysis process and the instructional strategies, rather than the delivery mode that determine the process of instruction" (p. 10). However, the current study showed that both had parts in the design decisions.

Regarding the pedagogical approach, the needs were identified as the need for an improved pedagogy that would support active student participation and involvement; enhance support mechanisms for instructor, peer, and expert; and group work and authentic activities. Pedagogy is a major constituent of a learning environment since it offers a theoretical foundation to the design and development of instruction that is needed for effective and efficient instruction (Bednar, Cunningham, Duffy, & Perry, 1992; Spector, 2008). The need for an improved pedagogy in moving from one delivery

environment to another is critical so as to support the new environment with a well-grounded baseline. The design and development considerations for the new learning environment, therefore, can be considered to be dependent on the needs of the new pedagogy. The need for a new pedagogy in moving from F2F to online or blended environments was questioned and became matter of interest in the literature. Bunker and Vardi (2001) found three needs to use both online and F2F components as the need to improve the access for unit information, the need to increase the amount and quality of student interaction, and the need to increase student autonomy. These needs can point a need for improved pedagogy parallel to present study findings.

Limited interaction was found to be another need to be considered. Considering the asynchronous capabilities of the online environment, parallel to what literature says, interaction can be regarded as one of the most important issues for the need of shifting to blended learning environment due to advances of communications technologies (Garrison & Vaughan, 2008; Palloff & Pratt, 2005). Garrison and Vaughan (2008) offered the most essential potential of blended learning to be increased interaction and more meaningful problem-solving processes.

The role of the instructor was another important consideration. The gaps found as limitations in tracking student progress and equipping them with necessary resources and demonstrations due to time limits and big classroom size were also mentioned in the related literature as the weaknesses of the F2F environment and found to be a great reason to move from a F2F environment to blended learning environment (Garrison & Vaughan, 2008; McCray, 2000). Tracking student progress is known to be difficult for large enrollment courses. Having limited resources is also a concern for most university courses. Student role was also analyzed and considered at this phase. Student active participation is critical in a course since they are the main actors of the course as much as the course instructor. Identification of student role was characterized as student characteristics in most ID models. Especially for large classroom sizes, the study showed that blended learning offers a diverse set of opportunities for expanding student and instructor roles

**5.1.1.2 Issues on Design and Development**

The design and development phases in the literature covered the identification of goals and objectives, development of assessment and instructional materials, and development of instructional strategies (Brown & Green, 2006; Dick et al, 2001, Seels & Glasgow, 1998). IDers make use of the results of analysis in their decisions of design and development. Similarly, in the context of this study the course instructor benefited from the analysis results and focused on considerations for pedagogical approach, course materials and documents, course organization, interaction, and instructor and student roles in the design and development of the blended learning environment.

The considerations were centered on F2F and online components both in separate and in conjunction. When the literature is sought, however, different considerations can be found for online environments. In their paper on reflections of online course experiences, Vrasidas and McIsaac (2000) identified three design considerations in addition to content, students, goals, and assessment procedures as 1) selection of online and off-line activities; 2) decisions about how much content to be online and when students are referred to other resources, and 3) issues to promote student participation and moderation of online discussions. These considerations reveal an emphasis of the online environment in terms of media and organization of media appropriate to pedagogical choices. In the current study, the major distinction in the considerations specific to the blended learning design could be identified as the concern about the balance of online and F2F activities and related scheduling.

The findings showed that the pedagogical framework that the instructor used guided her in the design and development decisions. Merrill's first principles of instruction was used with a focus on authentic activities. This allowed the use of a framework in designing learning activities and developing materials, which was critical in moving from a F2F learning environment to a blended one. A similar effort in using the principles for a blended learning environment was done by Margaryan, Collis and Cooke (2004). They described the major benefits of using these principles as the use of Web technology as a medium since it offered differences in interactions among instructors and learners and the basics of work-based learning, which was the core of their study and matched the principles of instruction. Use of principles of instruction provided the current study's course instructor with a facilitative approach in the design and development

considerations since these principles "relate to creating learning environments and products rather than prescribing how learners acquire knowledge and skill from these environments or products" (Merrill, 2002, p. 44).

Design and development of course materials and documents was the second issue that concerned the instructor. The need for course document creation both for online and F2F environments, upload of online documents, and development of F2F presentations, handouts, and hands-on materials were the issues to ponder. In this process, one issue that requires careful attention is the translation of F2F sources to the online environment and creation of online materials. The online environment can serve as a place where F2F documents are stored for students' easy access (Olapiriyakul & Scher, 2006) as well as a place for particular digital documents related to online component of the course.

Course organization was the third consideration of the instructor on the design and development processes. This issue is related to the instructional manipulations that can inform the designer of the things to teach and the ways to teach it (Mayer, 2008). In telematics-based distance education case, Jennings (1995) argued that the organization and management of online environment counted for the success of the course delivery. The current study results offered concerns on the balance of activities for F2F and online environments and communication of the technical features of the online system to students. In the balance of activities, it was important to organize the time allocation for each environment as also suggested in literature (e.g., Garrison & Vaughan, 2008). The proportion of time to be devoted to each environment was identified based on the pedagogical approach as well as the analysis results. It related to a focus on content, goals, and pedagogy (e.g., considerations for activities of project, software evaluations etc; communication and interaction among students and between instructor-student etc). Parallel to this focus, Olapiriyakul and Scher (2006) mentioned the requirements of the course objectives to be determinant for the time dedication in each environment and added one more determinant as the requirements of the 'course instructor'. This final determinant can be regarded as the needs of the pedagogical approach since it is instructor who determines the approaches.

Interaction was another issue of the design and development considerations. It was valued as a key ingredient of learning environments (Stubb, as cited in Picciano, 2002; Wagner, 1994; Woo & Reeves, 2007). In line with the pedagogical considerations and analysis

results, the instructor tried to create an environment in which student-student, student-instructor, and student-content interactions were supported. One more interaction was aimed to have student-expert interaction. Student-student interaction was considered to be the basic interaction type that support exchange of ideas and feedback among peers (Brookfield, 1987; Damon, 1984), and hence can be said to be critical in designing instruction. The student-instructor is as important as student-student interaction. Dating back to Plato's and Dewey's approaches to education, it was found the basic type of interaction in a learning environment (Anderson, 2003; Moore, 1989). For the student-content interaction, the instructor aimed to make use of variety of resources. These resources can be text based materials as well as multimedia materials (Tuovinen, 2000). Discussing the interaction and media choices, Anderson (2003) pointed the lack of knowledge for the best conditions, content, and instructional design to gain the maximum benefit from online media and interaction, and mentioned the role of individual choices, costs, marketplace concerns, and convenience to serve as the determinants of choice. The study results showed that instructor effort on interaction was concentrated on enrichment of all types of interaction with the joint use of online and F2F environments.

Final consideration on the design and development was on instructor and student roles. Instructor (or designer role) is found to be critical in the success of blended learning environments (Rowley, Bunker, & Cole, 2002). The findings showed that instructor role has not changed in F2F environment in moving from F2F to blended format, but the student roles expanded into a more active one. With the online forum discussions, F2F group discussions and presentations, both were given more active roles. Given the large class size, the activation of student participation becomes easier thanks to online components of blended learning environment.

Although not revealed as a key finding in the scope of the study, organizational culture and environment can play an important role in the design of the learning environment in terms of community building (Hanson & Clem, 2006). That is, the flexibility of course design provided to designers or instructors can be determinant for the design decisions as well.

## *Merrill's First Principles of Instruction as the Pedagogical Framework*

The instructor's focus on the development of the blended learning environment can be counted a good fit with Merrill's principles of instruction in terms of allowing a path for improved pedagogy for four reasons: the focus on problem-based nature of learning, enrichment of learning with authentic activities, match F2F activities with online activities, and the prescriptions identified for ID. The results showed that each of these availabilities helped the instructor in the design and development of the activities, resources, and the learning environment.

- Focus on problem: The very initial focus of the principles is on the problem-based nature of instruction. It should be noted that the problem-based nature distinguishes from problem-based learning approaches in that in solving the problems, students are presented with more direct instruction of problem components rather than given a problem to solve with a constructivist approach (Merrill et al, 2008). Merrill identified the place of problem focus in principles as the following (p. 176):

> … individual instructional components are most effectively taught in the
> context of a progression of real-world problems where the student is shown
> a problem, then taught the components, and then shown how the
> components are used to solve the problem or do the whole task.

The results showed that the use of problem in the context of the CEIT 209 course was helpful not only in introducing the foundational content (i.e. ID phases of CAI), but also the other application issues (i.e. educational software including drill-practice, tutorials, games, etc). F2F classes was designed to present the information in a direct instruction method, while online environment was designed as a support for students with necessary materials and resources as well as a discussion area for student group members.

- Authenticity: An authentic learning environment is characterized as the environment that immerses learners in the cognitive demands of real environment (Savery & Duffy, 1995). Authenticity in learning environments is given importance by a number of researchers in the literature due to allowing learners the transfer of theoretical knowledge to real-world and hence creating a meaningful learning context (Brown, Collins, & Duguid, 1989; Grabinger, 1996; Herrington & Oliver, 2000; Jonassen, 1999;

Reeves et al, 2002). To support this, use of authentic activities were embedded to course design considerations. It was regarded as a suitable and "ideal" approach for blended learning environments due to the "capability of blended learning to draw the maximum benefit from the technology affordances while retaining the best features of face-to-face teaching" (Oliver, Herrington, & Reeves, 2006, pp. 505-506). As Barab, Squire and Dueber (2000) notified, interaction among students, problem to be worked, and learning environment imbue authenticity, which demands a balance in the design and development considerations of learning environments. For this reason, the characteristics of authentic activities as suggested by Reeves et al (2002) were incorporated to activity design. As Reeves et al (2004) mentioned, predicting the challenges in the design of these activities beforehand is not easy. However, it can be argued that these main principles of the activities helped the instructor frame the activities easier.

- Balance activities in F2F and online: As Merrill (2002) suggested, the principles can be used in any learning environment regardless of the delivery format. This provided the instructor a design and delivery approach that helped balance the activities in F2F and online learning environment. In the pilot study, the blended learning environment was designed and developed based on the analysis results for the needs of the F2F environment. After the pilot study results, use of Merrill's principles as the pedagogical framework provided the instructor a more neat and organized approach in the balance of activities and approaches. For the F2F environment, the instructor considered the use of more inclusion of authentic tasks, presentations, expert seminars, and discussions. The online environment was used for asynchronous purposes in discussing scenario-based issues and material and resource distribution. These were all related to problem, activation, demonstration, and application principles. The integration principle was more related to transfer of knowledge and the instructor considered making use of student showcases, reports, and in-school uses of their materials.

- ID prescriptions: The principles' being not bounded to one learning theory makes the ID considerations flexible for incorporating different approaches. In the design of the blended learning environment, the instructor used an eclectic approach by combining the dimensions that behaviorism, cognitivism, and constructivism appropriate to the needs of the course environment as suggested by Ertmer and Newby (1993). Diverse strategies and teaching methods could be used in harmony in any design principle (Merrill et al, 2008). Using the principles as the framework also provided the instructor to

have a clear and concise conception on student and instructor roles as well as a clarification of the context (Ertmer & Newby, 1993; Koohang & Durante, 2003).

### 5.1.2 Instructor Experiences on Implementation

### 5.1.2.1 Instructor Experiences on the Enablers of the Blended Learning Environment

The major themes of the findings on instructor experiences had a focus on the two delivery environments of the blended learning environment as separate and as a whole. That is, themes on instructor experiences were grouped into enablers of F2F environment, enablers of online environment, and enablers of the blended learning environment. Taking the major scope of the study into consideration, the findings on blended learning environment are discussed in the following paragraphs.

The findings emerged as the complementary strengths of the online and F2F environments and included the issues of arousing student interest and participation potentially more; having flexibility; saving time for certain course activities; more easily tracking student progress; and increased interaction, collaboration and communication opportunities. Parallel enablers were mentioned in the related research studies including improved pedagogy (Aycock, Garnham, & Kaleta, 2002; Dziuban et al, 2004, Voos, 2003), flexibility (Graham, 2006; Dziuban et al, 2004; Palloff & Pratt, 2007; Rovai & Jordan, 2004), and increased collaboration, communication, and interaction opportunities (Bonk, Kim, & Zeng, 2006; Littlejohn & Pegler, 2007; Ostugthorpe & Graham, 2003; Palloff & Pratt, 2007). These enablers are discussed in the following paragraphs for each category.

There are also several issues that were suggested as the main enablers of the use of blended learning in literature, but not found critical in the scope of this study. These included increased cost-effectiveness by reducing the F2F seat time (Chamberlain, Davis, & Kumar, 2005; Koohang & Durante, 2003; Ostugthorpe & Graham, 2003), improved retention (Heterick & Twigg, 2003), and improved outcomes (Boyle et al, 2003; Garnham & Kaleta, 2002; McCray, 2000). Cost-effectiveness might not be a significant enabler in this study considering the already available features of the course context, which can be regarded as a local issue. Improved outcomes and improved retention might not be incidents found as enabler in this study, since the focus of the researcher was more on the process rather than on product. These results may suggest that the intent and focus of the

instructor or IDer for the use of a blended learning environment can be determinant for its enabling features and benefits to the course.

### *Arousing Student Interest and Participation*

The results revealed that the course instructor could be arousing students' interests and student participation potentially more in the blended learning environment. The quotations of the course instructor and peers suggest that students who were passive in the F2F environment had a chance to be more active in online environment and vice versa. One might expect this result since students are given more chances to voice their presence in blended environment than a single delivery environment. This is an issue related to social presence as well as multiple media use. Studies indicate high perceptions of learning and student satisfaction with the course and instructor associated with high social presence (Gunawerdana & Zittle, 1997; Richardson & Swan, 2003). In their study with 48 graduate students as participants of a blended course in health education, So and Brush (2008) found that students perceived the communication medium as a critical factor to their social presence. As Ginns and Ellis (2007) indicated, students need to be communicated the functions of each activities and strategies to their learning in the blended learning environment. Other than this, in using blended learning environment for an introductory programming course, Boyle et al (2003) found that they could be able to increase student engagement In line with these study implications, the present study results indicated that the instructor could be able to attract more interest and enhanced participation by supporting social presence with the joint use of F2F and online environments.

### *Flexibility*

The use of online and F2F environments in harmony enabled the course instructor to take advantage of the alternatives that each environment offers whenever needed. It was easier to move from one environment to another in activities, resource supply, announcements and the other course requirements flexibly (Dziuban et al, 2004; Graham, 2006; Palloff & Pratt, 2007; Rovai & Jordan, 2004). With this feature, the use of blended learning environments is appreciated by course instructors (Palloff & Pratt, 2007). The use of different environments appropriate to needs during the implementation phase can save time for the instructor as well as flexibly manage the course requirements.

*Saving Time for Course Activities*

Saving time for course activities was more related to the availability of online environment for certain tasks. One might caution that the design decisions might make a difference in the functions of each environment and hence might offer different enablers (i.e., saving time for online activities). This concern was found to be a reason for moving to blended courses. The results showed that sharing certain course load to two environment enhanced more focus for each activity (i.e., more in-depth discussions in online while more in-depth content presentation in F2F). These tasks and activities included demonstration of examples, discussions on content, and group activities. When the content was introduced in F2F class, online environment was used for discussions, which saved time for F2F presentations. The critical reminders, important news or schedule changes were all announced via online environment, which again saved time for F2F environment. Other than this, student discussions of the issues on what experts pointed out in seminars in the online environment again saved time for extended seminar durations.

*More Easily Tracking Students' Progress*

Using blended learning environment enabled the course instructor have more chance to track students' progress with a variety of interaction opportunities in the F2F and online environments. Students' logs on time spent for the access to online documents and forum environment were kept, which helped to assess students' progress as a plus to F2F environment. Corollary to this finding Boyle et al (2003) remarked the enabler of blended assessment strategy to be better in terms of catching plagiarists online and balancing the environments.

*Increased Interaction, Collaboration and Communication Opportunities*

With the blend of online and F2F environments, blended learning environment enabled instructor have increased interaction both among students and between student-instructor. The increased interaction among students was realized via student group discussions in F2F class, group projects, student presentations, and online discussions. It can be asserted that with the use of cooperative group works both in online and F2F environments, creating an environment supported by social interaction and communication was enhanced, which are indicated to enhance scaffolding and guidance (Ge & Land, 2003; Vygotsky, 1978). It can also enhance more collaboration and communication opportunity

for students. The literature offers parallel arguments for the blended learning environments (e.g., Bonk et al, 2006; Littlejohn & Pegler, 2007; Ostugthorpe & Graham, 2003; Palloff & Pratt, 2007). Much of interaction is attributed to online environment in blended courses (Boerner, 2002), which increases the interaction of F2F courses when designed in blended format.

In online discussions with authentic scenarios, one strategy that the instructor used was dividing the class into small groups. Both students and the instructor were satisfied with this grouping since it allowed more organized and easy to track appeal of the discussions. Parallel results were found in Bliss and Lawrence (2009)'s study in which the researchers compared the small group and whole class discussions in online environment. The study results corroborated the present study in that the researchers found that small group discussions allowed richer quality responses as well as more student participation.

The results also showed that use of blended learning environment enabled the instructor to create a community of inquiry with the availability of communication technologies, mainly the asynchronous forum environment, by providing "the condition for free and open dialogue, critical debate, negotiation and agreement-the hallmark of higher education" (Garrison & Kanuka, 2004, p. 97). This was an attribute of the blended learning environment not just with the capability of online environment, but also with the F2F environment with its capability for an open environment for community building.

### 5.1.2.2 Instructor Experiences on the Barriers of Blended Learning Environment

Whilst the use of blended learning environment offered great opportunities for the instructor, it contained a number of challenges as well. The results on instructor experiences showed evidence on the barriers of increased workload, difficulties related to the course and time management, overlaps, and the barriers in creating harmony among F2F and online environments.

The literature suggests similar and diverse barriers and challenges of the use of blended learning. The commonly found issues were increased time devotion (Dziuban & Moskal, 2004), increased workload (Bates & Poole, 2003; Lefoe & Hedberg, 2006; Littlejohn & Pegler, 2007; Owston, Garrison, & Cook, 2006), and deciding on the right blend (Rowley et al, 2002) regardless of the institutional level (i.e., k-12, corporate, higher education). The literature suggests several barriers which were not faced in the study as the

administrative pressures for improved standardized test scores (Glading, 2004; Pye & Sullivan, 2001), quality assurance (Jones, 2006), and preparing students to use blended environment (University of Wisconsin Learning Technology Center, nd). Administrative pressure was not a barrier faced in the scope of this study since this barrier is specific to institutional level. Quality assurance is a barrier mainly attributed to online environment. Due to the context of the course (i.e., available online resources, student incline to use technology etc), quality assurance was not appeared to be a significant barrier. In this study overlaps, technical needs and course/time management barriers emerged as significant barriers.

### *Increased Workload*

Increased workload is a term that was used frequently in the use of online and distance learning environments in courses (e.g., ). The instructor needed to spend more time for the blended course compared to traditional F2F courses. Although the course work and load was divided into two for the F2F and online environments, the instructor's time spent for getting prepared for the course and carrying out the course tasks was doubled. In addition, she needed to deal with the technical problems and had difficulty in fixing these problems on her own. Supporting this result, it was suggested in the literature that instructors should not be the "webmaster" (Bates & Poole, 2003, p. 187) or the technical provider. Instead they can take help from teaching assistants (Garrison & Kanuka, 2004), or technical support team of his/her institution.

The results showed that the blended learning environment placed a burden on the instructor not only physically (i.e. taking her time), but also cognitively. This finding contradicts Garrison and Vaughan (2008)'s argument that said if designed carefully, blended learning environments can ease the workload, which is contradictory to present research findings. Although designed with a lot of considerations on the needs, the instructor could not avoid increased workload. There are parallel arguments in the literature about increased workload (e.g., Bates & Poole, 2003; Lefoe & Hedberg, 2006; Littlejohn & Pegler, 2007; Owston et al, 2006). Lack of experience can be regarded as a reason for such a barrier (Voos, 2003), which implies a considerable workload concern for novice instructors or IDers.

### *Course and Time Management*

The difficulties related to course and time management might stem from the design considerations on the portions of the online and F2F activities as well as the course content and classroom size. The instructor used online portions mostly to be supplementary for F2F portions although the portions were designed equal. This meant that the online environment served as an additional workload to F2F workload. This finding indicates that instructors need to divide the portions of the course appropriate to the needs but reduce time needed for each environment. Other than the portions of the course, the nature of the course context in terms of its content and classroom size counted for this barrier as well. The course was a foundational course including many readings, assignments, and projects. Therefore, managing these activities in a big class size as well as providing online feedback to the students and managing student complaints and demands were great challenges for the course instructor. Providing appropriate feedback was also mentioned in the literature for online environments as a challenge for instructor (e.g., Lin & Lehman, 1999). Instructor needs to be flexible in the online environment in managing the time and the course (Eastmond, 2000; Hiltz & Goldman, 2005; Hoffman, 2006; Palloff & Pratt, 2007) when the course is designed to a blended format from a F2F one. Blended learning environments can offer a more engaging design for large enrollment courses (Garrison & Vaughan, 2008), and flexibility in design and implementation of the course becomes more critical in blended environment in this respect.

### *Overlaps*

Overlap in activities in a F2F and an online environment was regarded as another barrier in the implementation of the blended courses. The discussions, at most, were getting repeated in online and F2F environments, which was sometimes inevitable for the instructor. While repeating can complement each other for students' learning, it might create the barrier to balance the learning environment in terms of time and course management.

### *Harmony among F2F and Online Environments*

Final concern that challenged the instructor was creating harmony among F2F and online environments. This barrier was emerged due to the heavy content and the workload

resulting from the above-mentioned barriers including balance of the portions of activities and tasks between online and F2F environments, time allocation, and the assessment of students in the overall course. It was an issue to balance activities of discussions, group project works, and presentations in the online and F2F environment during the implementation. In the design of the course and in the syllabus, the instructor determined equal portions for online and F2F activities. However, the implementation period revealed that managing students' demands and the activity completion procedures were not that easy in practice. Considering the heavy content of the course, managing them got even harder. Assessment was another great issue to handle for the instructor. How much grade to assign for each activity and how to grade F2F and online participation and activity completion considerably challenged the instructor. This can be considered in line with instructor's competencies from the beginning of the course design.

In addition, course assistants or peers can help in certain portions of the course (i.e forum, projects). Instructor also needs to have technical help for the online environment when needed, so support for technical issues (i.e., upload of documents, forum features) needs to be provided by the organization/university. Although Aycock et al (2002) did not find technology as a significant barrier, the instructo challenged to manage the online environment.

### 5.1.3 Student Experiences on Implementation

When asked to describe their experiences of the blended learning environment in the questionnaire, students mostly used positive terms such as 'helpful', 'good', 'productive', or 'interactive'. Literature parallels the positive expressions of students for their experiences on blended course environments (e.g So & Brush, 2008). Although one can mention a lot of in-class and out-of-class effects that can and cannot be measured for students' positive perceptions, what is common in the reports and studies for student perceptions is the positive expressions for their blended learning experiences. One issue to be noted in the present study is the content of the several responses that are 'assignment', 'project', 'web-based course', and 'efficiency in time'. Perceiving course experience identical to assignments or projects can be considered as the burden of workload that these activities placed on students. It can also mean that students perceived the course as the completion of tasks that were most difficult, challenging or time-consuming. The expression of 'web-based course' can show that the student is concentrated on the online

part of the course. Finally, 'efficiency in time' can mean that the student perceived the experience as time-saving. These various expressions indicating diverse time considerations show that student had different experiences in the blended learning environment in using their study times.

Students' preferences for the learning environment were asked at the beginning and end of the semester. The results showed that number of students preferring traditional and blended learning environments increased while the online learning preference showed a decrease (27.5% to 10.0%). Blended learning environment preference increased from 67.5% to 77.5%. It can be argued that having at least one previous blended course experience, students already had a high preference at the beginning of the semester and their preferences remained at the high level.

### 5.1.3.1 Student Experiences on the Enablers of Blended Learning Environment

The quantitative results of student experiences on the enablers of the blended learning environment indicated that students mostly found course implementation in blended learning environment as a positive learning experience. Majority of students found interaction and communication with course instructor, development of different perspectives, instructor use of learning environment, and opportunity for individual contribution to course activities to be the major enablers of the blended learning environment to their learning. The lowest mean score was for taking students' interests and preferences into consideration for the course design with a neutral level. The qualitative results offered extensive issues on the students' experiences. Students found blended learning experience to be an opportunity to learn catch all points of coruse content via the facilitation of different environment, to have increased motivation, to voice opinions and see others' opinions more, and to have time efficiency, reinforcement of learning, better instructor monitor on student progress, more instructor support, wide access to resources, continuity in course, and more area for discussion.

The literature suggested both similar and diverse enablers for the use of blended learning environment from students' perspectives. There are parallel findings regarding students satisfaction and positive perceptions on increased interaction and participation (Ateş et al, 2008; Dziuban et al., 2006; Stacey & Gerbic, 2007; So & Brush, 2008), motivation (Klein, Noe, & Wang, 2006; Kocaman-Karoglu. 2009), and flexibility in terms of time use, study,

and participate (Dziuban et al., 2006; Garnham & Kaleta, 2004). Other than these, Akkoyunlu and Soylu-Yilmaz (2008) mentioned the support of different learning styles. Aspden and Helm (2004) found more active student participation with the opportunities for more communication, access to resources, and interaction with peers. In the study of student perceptions on online and blended formats of an undergraduate course, Uskov (2005) found that students regarded interactive Web-based learning (63%), self-paced learning (56%), in-classroom face-to-face instruction (49%), e-mail communication (49%), and independent completion of homework assignments using student's own computer (49%) as the most important components of their blended course experience. The common point among these results is that the enablers of a blended learning environment depend on its contextual components with an emphasis on the course elements of the blend and pedagogy of using these elements.

### *Interaction and Communication with the Instructor*

Interaction and communication with the instructor was perceived as one of the main enablers of the blended learning environment. With the capabilities of the online environment, interaction opportunities in students-student, instructor-student and student-content increased. The interaction types suggested by Moore (1989) were attributed to be the considerably important feature of online environments while having implications for F2F environments as well (Anderson, 2003). Nevertheless, strong interaction was regarded as an indication of rich learning environments (Dempsey & Van Eck, 2007) and the use of two environments increased the interaction and communication opportunities at best.

When students were asked their comfort in asking questions to instructor in a questionnaire at the beginning of the semester, their responses had an agree level. At the end of the semester, however, their responses for the item "I had effective interaction and communication with the course instructor" was at the strongly agree level. This result can be attributed to the facilitative course structures of the blended learning environment which probably enhanced better communication and interaction with the course instructor more than students' expectations.

### *Development of Different Perspectives*

The development of different perspectives was mentioned a lot as a major enabler of the blended learning environment. However, it can be attributed more to the pedagogy of the course with the authentic activities (Reeves et al., 2002). One issue that can be derived from this result is that the F2F and online delivery environments might have offered students opportunities of different media to foster their learning in multiple levels via variety of activities in different learning environments including synchronous and asynchronous discussion opportunities.

### *Instructor Use of Blended Learning Environment*

Course instructor has a critical role in the success of a course design as suggested by many researchers and authors in the literature (e.g., Palloff & Pratt, 2007). In this study, the results showed that instructor role changed from mere information disseminator to more of a facilitator. The students stressed the major enabler to their learning was instructor's effective and efficient use of learning environment, which depends on her/his teaching style and presence. Other than instructor's use of the environment, the students also mentioned the enablers of the environment for the instructor to better monitor their student progress and for students to have the opportunity to acquire more instructor support.

### *Opportunity to Use Different Environments*

One of the major contributions of blended learning environments to student learning was found to be the availability of two environments (F2F and online). This meant the use of one environment when the information was not understood or missed in the other. For example, when students could not catch issues that were presented in the F2F class, they could go online, review the slides and resources, and study in the online environment. It helped not only for the later use of the content but also in the earlier use, meaning that the students could use the information in one environment to gain prior knowledge to be used in the other.

### *Increased Motivation*

Motivation is regarded as a critical variable in education (Seel, 2008). In the learning environments with an online component, student motivation gain even more importance. In the related literature are several types of motivation: intrinsic and extrinsic; which may

be existent or absent altogether (Seel, 2008). Intrinsic motivation comes from the inner aspects of the experience, while extrinsic motivation is supported via other features not related to the experience like course design and implementation issues (Newby et al., 2008). Seel mentioned about "cognitive engagement" to describe the process in which "learners become motivated to take full control of their own learning" (p. 48). The present study results showed some indications of students' cognitive engagement with the course content. Both quantitative and qualitative findings showed that students were motivated for the course with the reasons of the opportunity of voicing opinions, the real-world relevance of activities and guest seminars, and the activities in which they gained different skills. These issues can be considered to be the motives that acted as supports to students' extrinsic motivation.

One issue for increased motivation can be a result of the course activities that supported students to find real-world relevance. The project, in this sense, was mentioned to be the major activity that motivated them to be interested in the course. Another enabler was mentioned as the expert seminars that showed students the theoretical content that was presented had value in work settings.

In the study with 47 undergraduate students for a pre-service teacher education course, Kocaman-Karoglu (2009) found that students perceived high motivation in respect to attention, relevance, confidence, and satisfaction. The study included the use of good practice principles as the design framework, which enhanced contact between students and faculty, development of cooperation, support of active learning, communication of high expectation, and respect for diverse talents and ways of learning. The use of these principles was found to be motivating students to the course.

Klein et al (2006) asserted that learner characteristics and instructional characteristics of the learning environment impact the motivation of students. They also stated that perceived enablers and enablers to the learning environment impacts student motivation with the following explanation: "Because learners believe that their efforts will be facilitated rather than hindered, they become more motivated" (p. 671). The reverse impact can be also mentioned for this study context. That is, it might be argued that just as students' positive perceptions increased their motivation for the course, their motivation impacted their perceptions positively as well.

### *Voice Opinions*

Being able to voice opinions was a facilitative course structure that was stated as the perceived enabler of blended learning environment by students both in qualitative and quantitative results. The mean score for the item "The course provided opportunity to express my thoughts on what I learnt (F2F or online)" was 4.05 denoting an agree level. The qualitative responses were focused on the availabilities of variety of activities to discuss issues and hence find a place to voice opinions. The major places mentioned were the online forum discussions on sample scenarios and expert seminars as well as opinions for the course structure, and the F2F discussions on the presented content. This was perhaps another best feature of a blended learning environment to offer students different environments to participate and voice opinions. Considering the large number of students in class, providing students with a broad range of environments increases the flexibility of participation. Although a reverse effect can also be considered for students to feel exhausted for the necessity of participation (REF), this was not an outcome of this study. This can be attributed to the design of the course as well as nature of the course context.

### *Time Efficiency*

Students had positive opinions for the time use due to the flexibility of asking questions and responding to peers, and studying the course content. The asynchronous nature of the online environment supported students' participation time and provided flexibility to access course resources and interaction area in their preferred time and place as also found a significant enabler by Garnham and Kaleta (2004). The flexibility of accessing the learning environment is not the only issue regarding this theme. Another important aspect of time use was mentioned as the availability of all course materials as well as communication and interaction in one place that saved time to access. Final concern was the using F2F environment more efficiently by staying focused on the content, not the other issues (i.e., announcements, detailed discussions, QAs, etc); and using online environment more efficiently since the content was covered in F2F and it was the discussions, resources, etc that was left to online.

### *Reinforcement of Learning*

Students stated positive arguments on their learning. One issue was recall of prior knowledge that was gained in one environment. Quantitative results showed that each

environment provided students opportunity to recall what they learned in the other environment. Parallel concerns were raised in qualitative data in that students could use the information in one place that they gained in the other. It can be argued from this result that students might need to focus each environment with a consideration for the other, which can increase their level of engagement, and hence, learning.

Another issue was the cooperation among group members to support students' processes of learning. In a repeated-measures experimental design study, Ocker and Yaverbaum (1999) investigated the effectiveness of F2F collaboration and online collaboration in an asynchronous environment, and found asynchronous collaboration to be as effective as F2F collaboration in terms of learning, quality of solution, solution content, and satisfaction with the solution quality although students satisfaction was significantly less in terms of group interaction process and the quality of group discussions. These results can be significant in interpreting the current study's results in that by using the online discussion area, students might be able to continue their F2F team efforts and reinforce their social presence (Johnson & Johnson, 2008; Kreijns, Kirschner, & Jochems, 2003).

Additionally to social presence, the asynchronous nature of the online environment might also support student groups' learning in terms of negotiation of meaning and community building (Wenger, 1998) with the notion that knowledge was developed in a social process (Naidu, 2008). The synchronous nature of F2F environment supports the community building as suggested and supporting learners with the cooperative learning both in online and F2F increases their opportunities to share their knowledge (Newby et al., 2006). Finally, it can be also argued that supporting students with student-centered activities including projects, discussions, and presentations could enhance their "motivation to learn, retention of knowledge, depth of understanding, and appreciation of the subject being taught" (Felder & Brent, 1996, p. 43), which can be valued as pedagogical enablers of the blended learning environment.

### *Wide Access to Resources*

When the access to resources was mentioned during the qualitative arguments, the students mostly attributed this issue to online affordances of the blended learning environment. This is a major aspect of the use of LMSs (Woods, Baker, & Hopper, 2004) .Online environment was not the only place, however, since many resources were

demonstrated in F2F environment as well. Providing learners with multiple ways of knowledge presentation support them in their learning (Spiro, Coulson, Feltovich, & Anderson, 1988).

### *Continuity in Course*

Using two learning environments enabled students to have continuous environment for their learning process. That is, they could be able to benefit from one place to learn an issue and use it in the other. For example, students could use online environment to investigate the links and resources in which they were presented with information that would be discussed in the F2F course.

### *More Area for Discussion*

The use of synchronous nature of F2F environment and the asynchronous nature of online environment provided students with the opportunity to have an extended place for discussing course content. The students found this feature as an important enabler of the blended learning environment. The F2F session discussions enabled students to recall what they were presented in that particular course, while the online forum enabled to have extensive discussions on sample real-life scenarios on content. Congruent with this result, Vess (2005) found that use of online discussions enabled students' engagement with the F2F discussions in her study with 32 students taking a hybrid course. In addition to the online scenario discussions, the present study results showed that the students also could be able to discuss the issues mentioned in expert seminars, their ideas on the structure of the course and the group project discussions, which extended their F2F discussions and enabled a new area for the issues that were not discussed in class.

### 5.1.3.2 Student Experiences on the Barriers of Blended Learning Environment

The barriers on the questionnaire were rated relatively weak with means ranging from 1.89 to 3.00 on the 5-point scale. Students found 'workload' and 'timing' (i.e. time use in environments and time loss) issues and 'personal motivation' as the most common barriers of their blended learning environment while they regarded 'instructor use of learning environment', 'interaction and communication with instructor' as the least common barriers. The qualitative results yielded additional categories including 'cultural issues', specific concerns on 'course design', and 'dependability of one environment to the other'.

Similar to present study results, time management, workload, course design barriers and personal barriers including familial and career pressures were found to be counted as barriers in the related literature (Futch, 2005; Lupshenyuk, 2008; Tanner, 2007). In Futch's (2005) study, students mentioned poor course organization as a barrier to their learning. Different than the study results, Tanner (2007) found that students perceived lack of technology literacy skills as a barrier to their learning, which was not a barrier in this study. Gulbahar and Madran (2009) mentioned this issue as the complexity of the technologies used for the online portion. The reason for not facing this barrier in the present study might be attributed to the context of the course, since the learners were advance computer users. This might imply that lack of technology literacy skills may be a barrier for students who do not have necessary background for gaining these skills.

*Workload Issues*

Increased workload due to the heavy load of both online and F2F environments was mentioned by students as one of the main barriers of the blended learning environment. They also believed that time commitment required for the course was a part of this barrier as well. It was found that students' complains about workload increased after the midst of the semester, which was the start of the project assignment. It can be argued that when the assignments increased throughout the semester, the students might perceive the overall course load too much and attribute blended learning environment as a time loss.

*Course Design Issues*

Course design barriers were suggested to be the barriers resulted from activity design, scheduling of activities, and staying on track. Activity design was related to the amount of and guidance for assignments and activities in each environment. They found assignments and readings too much for them. This is an issue that is very much related to workload as well. These findings suggested that there is a need to decrease the number of assignments for each environment in a blended learning design. Guidance and support can be more needed for blended learning environments in activity completions and processes in each activity and assignment in this manner.

Scheduling of activities is critical in balancing the course work. The changes in schedules made the students feel uncomfortable in keeping track of the course. Consistency among the scheduling of activities and the balance in assignments were seemingly important.

Having necessary participation was also voiced as a barrier. This result can signify the participation as an issue in the blended learning environment designs. How much and to what extent participation would be graded need to be communicated to students and they need to be supported.

### *Cultural Issues*

Students mentioned the medium of language used, interaction and communication patterns, personal issues, and technical issues as barriers, which were grouped in the cultural issues themes. Regarding the medium of language used, it should be noted that the medium of language was English. This was a specific barrier of the context of the course and university setting. There were international students in the course and it was important to consistently use English, not the students' mother language, Turkish. The students found it constraining their participation to use English as a medium of communication. The language becomes a barrier not only for nonnative speakers of English but also for students who do not feel comfortable about their writing skills (Palloff & Pratt, 2007). Other barriers in this category were found to be the study habits and their interaction and communication patterns that prevented them to fully concentrate on the team work and course activities that required rich interactions among group members. These findings may imply that the instructors need to be aware of students with such concerns and develop strategies not to let students fall behind their classmates.

The personal barriers that students mentioned included time management problems, communication problems with peers, and language problems. Finally, the technical issues were the described as the need that students needed to know to complete the projects. This was a major concern for most students as they complained this problem several times and lack of technical support remained unsolved.

### *Dependability of One Environment to the Other*

Students perceived one environment being dependent upon the other as a barrier of the blended learning environment. They found online activities bounded to F2F and vice versa, which made participation and studying difficult for them. This barrier could be overcome by appropriate pedagogical strategies (Koohang & Durante, 2003).

### 5.1.3.3 Student Perceptions on the Necessary Conditions for Blended Learning Environment

The term 'condition' has different meanings with different combinations of educational phrases. Instructional conditions, for example were defined as "factors that influence the effects of methods and are therefore important for prescribing methods" (Reigeluth, 1983, p. 14). Conditions to learning has the meaning of required sets for various types of learning to occur and described to have two kinds: internal conditions of learning that refer to "the set of initial capabilities possessed by the learner", and external conditions of learning that "are independent in their [learners'] action" (Gagne, 1970, p. 23). What was meant 'condition' in the scope of this study was an expression used to define the situations that were necessary for the realm of a blended learning implementation and can be categorized mostly the external conditions for learning in Gagne's classification. Identifying conditions of learning is important since they inform the planning of instruction (Gagne, 1970), and hence provide implications for design of effective instruction in a learning environment.

Students perceived a number of issues on physical components, course design, course context, and instructor and student willingness as necessary conditions for a blended learning environment. The physical issues were centered on the needs for equipment, technical support, usable online environment, and allocation of resources and documents. The need for equipment is perhaps a number one issue to offer a blended environment. Technical support was the second condition needed especially for the online environment to maintain functions properly. Students expressed concern on usability of online environment with features of being eye-catching and appealing. In the online component of blended courses, instructors make use of LMS such as Blackboard, Moodle, or Sakai, or a web page designed to post course materials. The use of LMSs offers advantages like consistency and ease of use or easy support maintenance, pre-set grading criteria and resources, and also disadvantages like lack of uniqueness of a course, establishing teaching presence or reflecting instructor teaching style (Huguet, Wright, & Haley, 2008). The final issue was allocation of resources and documents for students.

The course design needs to consider the issues of student motivation, students' active participation, a sharing and interactive environment, and support of one environment to the other. Supporting students' extrinsic motivation was also mentioned in the instructor

experiences part to be critical to the pedagogical approach. Students suggested the use of arousing interest via interesting course materials, links, seminars, and sample programs demonstrations, providing instant feedback from instructor and peers, relating activities with real life via expert seminars and authentic projects, and tracking their progresses via logs, forum, quizzes, and attendance sheets. Another consideration was acknowledged as enhancing students' active participation. This can also be regarded designing and using techniques and methods for making student active in a blended learning environment. In the creation of an environment, consideration of information sharing and interaction among students, instructor, and content was regarded important. In such a design, it can be also regarded imperative for each environment activities to support each other.

A third condition was expressed as the appropriateness of course context in terms of students' having necessary background knowledge and competency in using the blended learning environment and course's nature in terms of content. The terms "quality students", "knowledgeable students", "deliberate students", or "computer-literate students" were used to describe the students that meet this condition. Appropriateness of content is a controversial issue for a blended learning environment in the literature without a clear and concise depiction.

Final condition was instructor and student willingness for participation and their competence in using the environment. Students' willingness for participation can be considered in line with their motivational support as well as other course dynamics that were afore-mentioned as the balance, real-world relevance, and interaction and communication issues etc.

### 5.1.4 Critical Issues to the Use of Blended Learning Environment

The processes beginning from the analysis to the end of the implementation period engaged the course instructor into a great many experiences. The implementation period also involved students as the main actors of the environment and placed a lot of new experiences for them as well. The analysis of all data during these processes gathered from her own, peers, and students enabled the researcher to identify the issues of course design that were critical to the use of the blended learning environment. These included the context, pedagogical issues, instructor competency issues, and technical issues.

## *Context*

Regarding the context of the course, two issues were critical for the instructor in the blended course design: curricular issues and institutional issues. The curricular issues were mostly a specification of the content which also impacted the course activities and determined the blended learning design. It is also important in developing a rationale in the design of the learning environment (Posner & Rudnitsky, 2001; Tyler, 1949)

Appropriateness of content for the use of a blended learning environment was raised as a major concern by most participants. While several participants believed blended learning use for any content, others argued that subject area can change everything. What is meant in these changes were mostly impacts of the features of online and F2F environments. When participants were asked the use of blended learning in other courses, students mostly focused on the asynchronous feature of the online environment, while the peers focused more on the capabilities of online environment that is superior to F2F environment. The instructor data revealed a focus on the relative advantage of online environment in terms of resource and document supply as well as team cooperation that support F2F environment activities.

Institutional and administrative issues were also critical to the design of the course since the support from the institution is critical in the creation and maintenance of the online environment as well as F2F environment. Support on logistics including technical support and management of the learning environment was needed to implement a blended learning environment.

## *The Pedagogical Framework*

The pedagogical approach was critical to course design since it is determinant for and a specification of the instructional approaches and strategies to be used, for the related instructor and student roles, and other course concerns of motivation, interaction, communication, and cooperation (Ertmer & Newby, 1993). The pedagogical framework not only communicates the specifics of the course design, but also prepares a deliberate ground on which to build the technology and approaches. As Bednar et al (1992) proposed, "… effective design is possible only if the developer has developed reflexive awareness of the theoretical basis underlying design" (p. 19). This theoretical basis provides IDers or instructors with a lens over how we view the learning environment

(Kirkley & Kirkley, 2005). Critiquing the increasing trend in technology use in higher education settings, McWilliam and Taylor (1998) suggest a fresh understanding of pedagogical approach on the use of technology. They point out the need for identifying the differences that delivery systems place on pedagogical approaches.

The instructional aims and scope as well as objectives of the course yielded an approach that matched the use of Merrill's Principles of Instruction, which were afore-mentioned. The results showed that the pedagogical approach also shaped the instructor and student roles. Supporting student motivation was very parallel to the pedagogical approach. While instructor had a facilitative and guiding role as well as information provider, the students had both active and passive roles. The final concern was the creation of harmony between online and F2F environment in terms of enriched interaction, intensive communication, and cooperation among all parties. In a study by Gulbahar and Madran (2009) on communication, collaboration, satisfaction, equity, and autonomy in blended learning environments, the pedagogical needs were found to be the needs to provide students with "technically and visually rich learning and assessment activities and opportunities to increase their technical competence" (p. 15). Combining these results with the present study findings, it can be argued that the pedagogical framework needs to support IDers or instructors with sound evidence on how to create harmony and richness in the design of course activities in terms of communication, collaboration, interaction, and technical aspects.

### *Instructor Competency*

Instructor competency is regarded as a fundamental issue in the success of any learning environment. The success of all design, development and implementation is, therefore, dependent on instructor competency. For blended learning environments, instructor competency is related to the competencies specific to both F2F and online environments since every environment puts demand for different instructor roles (Klein et al., 2004). The current study results implied that the required competencies are not limited to sum of competencies of F2F and online environments, but require a harmony of all these roles for blended learning environments. Amirault and Branson (2006) suggested the changing role of instructor in times as "juxtaposing at various points in history between *subject matter expert* and *expert in educational techniques*" (p. 70). In the current study, the instructor needed to be knowledgeable on content, competent on technology use, proficient in time

management and classroom and online management. This result, in line with what Amirault and Branson mentioned, can point out instructor competencies involve not only subject matter knowledge, but also the knowledge of pedagogy. Hence, it can be argued that the importance of instructor role increases in a blended learning environment in terms of creating balance.

Another dimension of the issue can be the experience that is needed for instructors to develop necessary competencies. Having experience in online teaching and technology use was suggested for successful implementation (Olapiriyakul & Scher, 2006), which implies the importance of experience as a critical part of teaching.

### *Technical Issues*

The technical issues for the design of the blended learning environment were mostly attributed to the needs of online environment. The technical availabilities, usability, and maintenance of the online environment were critical in the use of blended learning environment during all stages of design, development, and implementation. The synchronous and asynchronous capabilities of the online environment as well as the features and the primary purposes of the use of the LMS used were found important (Woods et al, 2004). Regarding the LMS use, related literature suggests several issues. One issue is related to the function of LMS in the web-based courses. In their study with 862 faculty members, Woods et al (2004) found that it was the experience with the system that determined the use of LMS for faculty. They also indicated that instructors used LMS mainly for course administration and management purposes and concluded that faculty lacked the use the LMS with full pedagogical potential.

Usability affects the students' ease of use, efficiency of use, and pleasure to use the system (Mack & Nielsen, 1994). Therefore, it can be regarded as an issue that affects students' perceptions to the use of online environment. A diverse perspective was pointed out by Ginn and Ellis (2007) who suggested that a focus on usability "runs the risk of failing to understand how students understand the role of the site for learning at large" and offers a focus on "teaching strategies that clarify the value of moderation of student postings, and the value of interaction between the students online" (p. 63).

## 5.2 Conclusion

The use of learning environments is changed drastically with the use of Internet technologies, which revealed the term blended learning that has become widely used for environments in which F2F and online instruction are used together. Related to this change, there are different opportunities and challenges that these learning environments reveal in the design, development, and implementation of instruction. One main conclusion from the findings of this research can be drawn as that the use of blended learning environments in terms of blending F2F and online learning environments can be regarded as a paramount initiative for the higher education institutions by maximizing the enablers of both environments. The results of the study imply that whilst blended learning environments had many opportunities for the students and course designers or instructors, it contained diverse challenges at the same time. When the design process is examined, the results also imply that the general approach of the course design for a blended learning environment is no different than any learning environment design. It is the decisions of the media use with a balance for a joint use of the environments that makes a change. Related implications are described and concluded in two sections: blended learning potentials for higher education and dynamics of blended course design.

### 5.2.1 Use of Blended Learning Environments in Higher Education

Perhaps the most important contribution of the use of a blended learning environment to a course delivery lies in its availabilities of variety of opportunities with the "flexibility for both learners and teachers in terms of resources, supports, and scaffolds" (Oliver et al, 2006, p. 502). Online environment helps to provide documents and up-date resources, provides access to documents anytime and anywhere, and offers extended communication and interaction opportunities (Carr-Chellman, & Duchastel, 2001; Swan, Shea, Fredericksen, Pickett, Pelz, & Maher, 2000). On the other side, F2F environment helps to build social interaction and adapt lesson with student progress. Due to the availability of F2F contact for online environment, blended courses fortify the community sense in learning (Rovai & Jordan, 2004). This is very much dependent on how the instructor balances the course components. The findings of this study showed that these benefits can be counted as the enablers of the blended learning environment. Regarding the large classroom size, using blended learning enhanced a good opportunity for more

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participation and communication as well as increased interaction and more meaningful problem-solving processes as suggested by Garrison and Vaughan (2008).

Another implication can be suggested as the modeling of the delivery environment to the students in a teacher education program. By using the blended learning environment, the instructor could be able to model how to integrate technology in a course delivery environment, which is a suggested strategy for teacher education (Ertmer, 2003; Goktas, 2006).

It is important to remark that the blended delivery format of the course in the scope of this course was a conversion from traditional format, not from the scratch. This had several remarks on the course implementation. First of all, the major issue is the availability of content and materials, which allowed the instructor to have the curriculum and content already decided and shortened the time for the development of materials and content (Bates & Poole, 2003). Regarding this issue, Boyle et al (2003) suggested a smooth but not hasty transition between the familiar issues and new issues involved. The second issue is the assumption that it will be an easier process. As Hofmann (2006) argued, it is not easier to redesign an existing program than starting from scratch since it needs a shift in the ideas of designing. It also places cultural, contextual, and curricular barriers in the sharing of the documents (Davis & Fill, 2007). The solutions to overcome these problems still remain vague since these barriers are partially related to intellectual property and copyright concern, which are institutionally resolved issues. In another perspective, Garrison and Kanuka (2004) identified blended learning as the following: "Blended learning inherently is about rethinking and redesigning the teaching and learning relationship" (p. 5), which indicate implications for the implementation period. The results of the study can support this idea since the instructor needed to rethink and redesign student and instructor roles in the scope of pedagogical considerations.

One issue that is important for novice instructors or IDers is that blended learning can serve as a medium for getting experienced on the use of online learning. As Dziuban et al (2004) remarked, first using a lower portion of online learning brings them experience in the environment to expand their expertise later. However, the barriers of the joint use of these environments can remain challenging part of the issue.

### 5.2.1.1 Potential Solutions to the Barriers to the Use of Blended Learning

Ertmer, Addison, Lane, Ross, and Woods' (1999) classification of barriers for technology implementation can be applied to blended settings and extended to both students and instructors as well: external (first-order) barriers and internal (second-order) barriers. Ertmer (1999) defined first order barriers as external to the teacher (instructor and students in the scope of this study) and incremental and institutional; while second order barriers are internal to the teacher and are fundamental and personal. In the scope of this study, the external barriers for the instructor emerged as increased workload, time and course management difficulties, and overlaps while the intrinsic barrier can be identified as creating harmony between environments that require personal attachment to the course design. For the students, the external barriers can be identified as increased workload, course design barriers including difficulties in scheduling activities and staying on track, and dependability of environments. The internal barriers included the personal barriers like difficulties in the medium of language, interaction and communication patterns, and time management problems.

For the solution of the external barriers that instructors faced, several issues can be highlighted. First, instructors need to be provided with necessary deliverables for the online and F2F environments including technical support, course implementation support (e.g., division of tasks to TAs or sharing workload with other instructors), and decreased workload (i.e. less course load). Since the internal barriers are more personal rather than institutional, they are regarded to be "less tangible" (Ertmer, 1999, p. 51). Strategies for developing a personal belief on the effectiveness of the use of blended learning environments needs to be embedded to institutional missions such as enhancements of rewards and recognition, necessary equipment, and a decrease in the workload (Picciano, 2001). Draffan and Grabinger (2006) suggested facilitation of interaction via cooperative attachment among students, instructors, and other course staff.

The strategies for overcoming student external barriers are mostly related to the pedagogical approach of the course design. In the course design, the instructors need to be careful on sustanining a balance in terms of workload and time devotion, support and guidance mechanisms, and assessment. In the scope of the internal barriers, the instructor needs to provide more support and guiadance. Communication of the functions of each activity for blended learning environment can be another strategy.

### 5.2.2 Course Design Dynamics

In designing a blended learning environment, there needs to be a lot of considerations to be made by the course designer. These include the learners, the content, and the context of the course environment. What makes these considerations different from traditional F2F or online courses are the issues of a joint environment discussed previously. This study showed that an improved pedagogy for the design of blended learning environment was the most important concern while the institutional issues such as support and technical issues also played critical roles.

Despite the overarching premise of ID to use the foundational knowledge on learning and thinking and the communication technologies for the creation of effective learning situations (Brown & Green, 2006), what Gagne pointed out in 1965 can perhaps be generalized to today's ID world as "There are no 'general' rules of learning known at present that can be used as guides in designing instruction" (p. v). There are so many issues that affect a learning environment, and designing instruction, therefore, is not universal. This does not mean to discard ID specifications and prescriptions, but rather to place an emphasis on the local dynamics of design considerations. Considering the ISD approach utilized in the course design of this study, its appropriateness to design focus can be questioned. As was described extensively by Zemke and Rossett (2002) based on arguments made, there are diverse criticisms on ISD for being flawed or put into practice wrongly. In their paper, the proponents of ISD point out the common elements of design needed for any learning environment in a systematic tradition, while the opponents criticize it for being a linear and rigid process with the lack of a heuristic approach. It can be argued that using an ISD approach in this study helped the instructor frame the processes in a clear and concise way as well as identifying the key challenges and key enablers to consider.

As Collins et al (2004) put forward, the implementation period of a design process involves considerations that go beyond the actual design with the limitation of specifications of all dynamics of the learning environment. This indication suggests the importance of iterations and instant modifications appropriate to the needs of the learning environment in practice. Iterations are parts of design in all phases (Dick et al, 2001; Posner & Rudnitsky, 2001) and found to be critical in present study's course design. Romiszowski (1981) proposed that "the design of instruction is seen as a cycle of

activities which should consider inputs, processes and outputs in relation to each other" (p. 1). While this study attempted to present the phases in a separate and linear fashion, it should be noted that there were always forwards and backwards between these phases in practice.

The results of the study also showed that the design process require course instructor be very determinant on the needs for a blended learning environment. That is, identification of the need of whether it is a particulat need to be offered blended learning environment has a great significance. Romiszowski (1981) gives a great analogy for the importance of the needs of instruction (pp. 39-40):

> … it may be legitimate to select a means of transport before deciding exactly where you want to go. This is when the experience of the journey is in itself the main aim of the exercise. But someone still needs to decide on a destination and route before starting the journey. Otherwise the journey does not get under way.

The results showed that when students were asked to comment on blended learning environment, they began talking about the online environment first. This can imply that since F2F environment was already in use in their educational background, they give importance to their online experiences a lot. Their perceptions for the blended learning environment experience were mostly targeted on their experiences online. This can imply that the initial focus needs to be given to online environment in the design considerations for courses that are redesigned from F2F to blended format.

What Hoffman (2002) explained as the main lesson learnt from a blended learning experience in the context of training setting has a common fit with higher education: "re-creating learning online and determining the right blend isn't easy or to be taken lightly" (p. 519). It is not a simple combination of online and F2F practices as it can be perceived at first hand, but require more considerations before going into designing a blended learning experience. It can be even harder for novice designers. For a novice designer, it is important to have a broad scope during design process rather than "getting stuck on completing certain tasks (e.g., needs assessment) in a certain sequence, or at a certain point in time" (Ertmer, York, & Gedik, 2009, p. 24). Therefore, designers or instructors need to be well supported by their institutions. Kirschner (2004) pointed out the importance of an integrated view that combines the pedagogical, technical, and organizational factors for e-learning. Based on the current study results, this issue can be broadened for blended learning environments as well.

As Garrison and Kanuka (2004) asserted, "no two blended learning designs are identical" (p. 97). This can be attributed to the nature of the design in general since it is very much up to the designer, instructor, and the context of the design environment. When it comes to blended learning, the proportions of the use of F2F and online environments can be a concern at the heart of this issue. The findings of the design considerations showed that after deciding on the proportions, the instructor needed to deal and pursue the harmony of two environments as well as dealing with their features within their own contexts. For this purpose, an understanding of what occurs in the F2F and online environments "provides critical information about the discipline, content, teaching methods, learning processes, and the media and technologies available to support the most effective combination(s)" (Voos, 2004, p. 4).

This study embraced authentic activities that were positively perceived by all participants. When authentic activities are designed in the creation of a learning environment, it places burden on the part of the instructor or IDer since it necessitates "a high degree of creativity and organization" (Oliver et al, 2006, p. 502). As the old proverb says, "I heard it and I forgot. I saw it and I remembered it. I did it and I learnt it". Blended learning in the creation of authentic learning activities was suggested since it allows flexibility for the resources, support mechanisms, and scaffolds (Oliver et al., 2006). Therefore, while designing authentic learning activities, the context of the learning environment should be linked with the real-life setting (Bennett et al, 2001, Grabinger, 1996). In this study, students were able to see how to create an instructional product by doing it via an authentic project. This is related to the concern that was named as "walk its talk" by Dede et al. (2002, p. 3) in that students could be able to develop a material in practice while theoretically learning how to develop it. The students expressed their gains from this experience as increased motivation and participation. Therefore, it can be argued that in the design of courses, supporting learners with authentic activities plays an important role in their increased motivation.

In the design of instruction, it is commonly argued that the setting has nothing to do with the quality of instruction, but it is the pedagogical approaches and instructor capabilities that count (Klein et al, 2004). Moving from this argument, when considered as the merge of different learning environments, it is expected that blended learning environments would have the same considerations in terms of instructional design processes. However,

this study showed that although the same processes of design, development, implementation and evaluation of the setting were followed in the course, the instructor needed to be more considerate of the issues that emerged with the merger of two different settings.

Merrill and Wilson (2007) argued that for effective instruction, it is the use of instructional theory that counts for success, not the learning environment. From a different stance on multimedia learning, Park and Hannafin (1993) pointed out the roles of other variables on design decisions as the following (p. 67):

> Design decisions are not made based solely on a given foundation, but upon presumed processing requirements, the strategies and methods deemed reasonable in supporting those processes, and the manner in which technology options support or hinder combinations of learning strategies and cognitive processes.

Taking this argument one step further, it can be argued that it is a matter of concern in ID to find ways to use media effectively in learning environments. This leads to a 'how' of designing effective instruction and it is hoped that this study could contribute to this question for blended learning environments.

Olapiriyakul and Scher (2006) suggested that students may tend to decrease their participation in F2F courses due to access to related materials in online environment, and recommended the creation of a sense of community among students, establishment of a leadership role in discussions, and use of strategies to encourage participation such as giving bonus points for participation in courses or discussions. Based on the results of present study, two major implications were revealed regarding participation. The first one is the function of each environment, which suggests that each environment should serve a different function and carry out certain parts of the course load. That is to say, online or F2F environments can complement or support each other, but should avoid repeating each other. The second issue is related to strategies to encourage participation. The results implied that balancing the instructor and students roles sufficient to different learning characteristics can help more participation.

The findings of the study also revealed that the instructor had different roles in F2F and online environments, which required instructors to have certain competencies in designing and delivering a blended course. These were found to being knowledgeable on content, competent on technology use, be proficient in time management and classroom and online

management as discussed in previous sections. Having an IDer role might have increased the instructor role. Although considerations on the pedagogical framework inform the most of instructor role, the delivery environments also play a role. In line with this idea, there are researchers who described the issues for the role of instructor in different environments. The first issue was highlighted as the need for a reconceptualization of instructor role with the integration of computer-mediated or Internet-based technologies in educational environments (Daugherty & Funke, 1998; Duffy & Kirkley, 2004; Ely, Foley, Freeman, & Scheel, 1995; Stacey & Gerbic, 2007; Zemsky & Massy, 2004) since online teaching and designing is different than that of the F2F (Palloff & Pratt, 1999; Wray et al, 2008). The changing role was described as "a shift from "the sage on the stage" to the "guide on the side"" (Newby et al., 2006, p. 293) and is characterized as the "promoter of sensorially rich learning experiences" (Molenda, 2008, p. 18). Computer-mediated communication (CMC), for example, enabled instructors a shift from their information dissemination role into critical inquiry and collaborative learning role (Tam, 2000).

One issue that might have challenged the instructor moving from F2F delivery format to online or blended learning can be considered as the lack of role models who used these delivery environments in their previous preservice years. It is commonly assumed that instructors develop and use their instructional strategies based on their previous course instructors' teaching (Bates & Poole, 2003). This might imply the importance of faculty modeling of the use of blended learning environments in preservice teacher education, which was previously documented in studies regarding ICT integration in teacher education (e.g., Ertmer, 2003; Goktas, 2006).

The second issue can be identified as the time considerations. Massy argued that the role of technology would not replace faculty which meant human factor in the learning environment, but could only lead to affect their time devotion and increase in their roles (cited in Phipps & Merisotis, 1999, p. 31). Similarly, Dziuban Moskal and Hartman (2005) noted that it takes more time for instructors to develop and implement a blended course compared to F2F courses. The study results paralleled these ideas by increasing the time needed for instructor to spend for every phase of the course design.

Another implication of the results was that instructor's previous experiences and the active roles on course design and implementation might have considerable inputs for students' positive perceptions. Instructor experiences as well as roles count for the success of

blended learning design (Rovai & Jordan, 2004). In a study on blended learning approach for instructors for a person-centered learning environment, Derntl and Motschnig-Pitrik (2004) reported their experiences and findings on patterns of student motivations due to course styles with different instructors. The authors came up with the result that student motivation was high with instructors with flexible and facilitative teaching style and who use interpersonal skills thoughtfully. In another study by Brooks (2009), instructor attitudes toward a blended learning environment were investigated. The results showed that faculty with more positive attitudes towards educational technology had more positive attitudes.

Parallel to what Derntl and Motschnig-Pitrik (2004) suggested, instructor needs to be highly open, respectful, flexible, and very facilitative in the blended learning environment with good interpersonal skills. In their study on college students' preferences on teaching style with 120 participants, Hull and Hull (1988) found that instructor's teaching style (demanding vs. supportive) was critical to students' preferences and learning. The students preferred more supportive roles, but found demanding style to be important for college teaching. Instructor gender also played a role in students' learning in favor of male demanding role than female demanding role. Regarding the gender issue, Miller and Chamberlin (2000)'s study also indicated significant findings on students' perceptions to instructors' educational attainment. In their study with 300 students, the researchers found that students attributed their female instructors as 'teachers' while male instructors as 'professor'. Although based on F2F environments, these two study's results can offer significant considerations for the scope of present study in that the female instructor's teaching style could have played an important role in student learning and, hence their perceptions.

In the blended learning environments, it is also important for instructors to be able to fit the learning activities with appropriate technologies (Klein et al, 2004). Mullen and Tallent-Runnels (2006) suggested instructors to challenge their students and make a balance in the instructional demands. Instructors need to provide students with support on what they are supposed to do, and therefore need to communicate the use and value of these instructional demands.

Parallel to instructor needs, IDers needs to adapt to the changes of the learning environments and develop strategies to handle the challenges. This study showed that

IDers awareness on the context and pedagogical approaches needed, and technology were critical to their design decisions. Sims and Koszalka (2008) argued the critical issue for IDers to be "change" in defining the key competencies (p. 575). The present study showed that the nature of the learning environment offer key decisions for practitioners in adapting this change.

## 5.3 Suggestions for Practice

### 5.3.1 Suggestions for Higher Education Institutions and Policy Makers

With the opportunities of online learning and the availabilities of the F2F environment, blended learning offers great potentials for higher education institutions. Ross and Gage (2006) remarks this issue by stating "… what will differentiate institutions from one another will not be *whether* [italics added] they have blended learning, but rather *how* they do the blending and *where* they fall on the blended learning spectrum" (p. 167). In such a context, institutions need to be encouraged to create policies and strategy plans on the creation and implementation of blended learning programs.

"How people are treated affects how they treat others. If staff members are treated autocratically and insensitively by management, with suspicion and disrespect, staff will treat clients the same way" (Patton, 2002, pp. 7-8). Taking this argument further as the way instructors learn to teach, it can be argued that the technological awareness and the way the technology was used in their training affect how instructors teach. For this reason, more online-enhanced courses are needed to be embedded to teacher training curricula and related training to instructors and technical support need to be provided.

In supporting the instructors, institutions can make use of professional development programs in which instructors can extend their experiences and gain different perspectives in blended learning environment creation and implementation. What needs to be required of these programs is the necessity of supporting instructors with training on online environment use, and design, development, and implementation of blended learning environments

In the 2020 Visions report of US Department of Commerce, The Learning Federation (2002) argued that the new roles of instructors and other professionals to use the innovations in their setting needs to be supported by the "creative management" of

institutions (p. 4). In this management, institutions need to formally and informally support and encourage instructors. Building a network for faculty to share their resources including content, courses, and their experiences on course practices can be a good strategy.

Technical support and utilization of technical support and maintenance system are needed in terms of online portions of the course. There is also the need for reward structures, decreased course load and mutual projects of blended courses by instructors. Institutions need to be careful in terms of management of these incentives as well as the intellectual property and copyright issues.

### 5.3.2 Suggestions for Course Instructors and Instructional Designers:

This study attempted to provide insight into the dynamics of designing a blended learning environment and potentially offer certain prescriptions for practitioners. For practicality, these issues are addressed under the subheadings of analysis, design and development, and implementation.

### 5.3.2.1 Suggestions for Analysis

$\Rightarrow$ Spend considerable time: Analysis process in terms of analyzing the needs, the content, the learners, the content, and the deliverables on media are critical to the effective instruction. Needs analysis is very critical to the design of blended courses especially for the ones that are transformed from F2F format. IDers need to devote a lot of time for this process.

$\Rightarrow$ Begin with specifying the need for a blended learning environment: The decision of the use of blended learning environment can be identified with an appropriate need analysis process. Analyze all dynamics of the learning context before deciding to use a blended learning design.

$\Rightarrow$ Focus on pedagogy: The pedagogical needs to use the specific media are critical for the blended course design. Analyze the pedagogical approaches and strategies needed for the learning environment.

$\Rightarrow$ Analyze the course content: Analyze the curricular issues and investigate the main topics of the course.

⇒     Analyze the assessment procedures: A provision on what assessment procedures are needed is critical.

⇒     Analyze the deliverables of the institution: Analyze the institutional deliverables including the technical and technological availabilities, the support mechanism for the technical and pedagogical needs, and the work share (including TAs or co-instructors).

      o   If you will be using an LMS that was set beforehand, get to know the functions of the system.

      o   If the LMS or any other online system will be selected after analysis, investigate the pedagogical, managerial, and technical functions of sample possible systems and review the previous reviews of the system done by instructors and students.

⇒     Consult other instructors or IDers: Experienced instructors or IDers in using blended learning environments can be a lot of help in analyzing not only the contextual variables, but also the pedagogical approaches.

### 5.3.2.2 Suggestions for Design and Development

⇒     Use a pedagogical framework: Use a suitable pedagogical framework in designing learning activities, instructional strategies, methods and approaches and developing course materials and documents as well as defining instructor and student roles.

⇒     Specify the functions of each environment: It is of crucial concern to define the function of the media and strategies in each environment as well as defining its function. Each environment has usually an integral role in blended courses, which suggests a complementary role for the functions of each media and strategies used.

⇒     Use authentic activities: Authenticity in learning is perceived to have great value in adult learners' learning and hence is a good strategy for blended learning environment designs.

⇒     Create the materials and documents: Specify the materials and documents to be created and begin developing them before the semester starts. If it is not possible to finish them before the semester, have a plan over the content and preparation of the materials.

⇒ Avoid overlaps. Design each environment within its own context. The online and F2F portions of the course can be supportive to each other but should not retake each other's function or be repetitive.

⇒ Create harmony among F2F and online environments: Be considerate of the workload and time devotion for both instructor and students and make a balance. Do not allow each environment include all course elements and the other act as an extra load, but divide course load among these environments at an optimum level.

⇒ Enrich interaction: Create activities that would enrich all types of interaction. Discussions, group works, authentic projects, expert seminars are good strategies to support interaction.

⇒ Use graphical sketches for your design: If possible, design your instruction flow in a graphical form using concept maps or advance organizers. Graphical representation helps to document the functions of each environment and the flow of the instruction at one hand. Creating each lesson's flow graphically can be very helpful.

### 5.3.2.3 Suggestions for Implementation

⇒ Communicate the use and function of blended learning environment: Students need to be explained what and how they are supposed to accomplish course needs by using the online and F2F environments, and therefore need to be communicated the use and value of the instructional activities in these environments.

⇒ Provide timely feedback: In the synchronous environments, it is easier to provide timely feedback, but it is asynchronous environment that makes this concern an issue to consider. Try to provide students with immediate feedback in the asynchronous parts.

⇒ Make resources available in multiple formats: Provide students with the course materials and documents available in each environment

⇒ Encourage students for timely feedback to their peers. Due to the asynchronous nature of the learning environment, students get frustrated when they do not get timely feedback from their team members. For course strategies that aim to enhance online group work, encourage your students to send timely feedback to their peers.

$\Rightarrow$ Be aware of cultural and language issues: Let students be comfortable in writing by encouraging them. Do not try to correct their language mistakes in F2F or in online environment.

$\Rightarrow$ Let anonymous postings: Allow students to send anonymous posts and responses for the issues on course delivery or questions on content.

$\Rightarrow$ Be flexible. Although there are usually set schedules for each activity and event in a learning environment at the beginning, needs can arise to make changes. Be flexible in updating your schedule and the workload for the needs arised during implementation.

$\Rightarrow$ Be consistent in using the functions of the each environment: If you are using one environment for one strategy, then use that strategy always in that particular environment. For example, if you are giving assignments in online environment, then give them online throughout the semester or if you are lecturing F2F, always lecture F2F.

$\Rightarrow$ Use authentic activities:

   o   Have expert seminars

   o   Involve all students to real-life tasks on content

$\Rightarrow$ Divide large classes into groups for discussions: For large classes, dividing students into 4-5 students for F2F and into 5-10 students for online environment can be easier to manage and can yield rich discussions among students.

$\Rightarrow$ Have harmony among F2F and online portions: Assigning complementary functions for the F2F and online portion is helpful for the harmony of the blended learning environment.

**Other Suggestions**

$\Rightarrow$ Work in collaboration: By nature, design is a complex activity requiring many iterations and considerations. In a blended learning environment, the complexity increases in the interplay between online and F2F components, which increases the importance of collaboration among students, instructors, IDers, and other course staff for such settings more.

$\Rightarrow$ Engage in professional development activities: Communities of practice as the grouping of people who exchange knowledge and experience informally can be a supportive professional development environment for instructors. Online communities of practice can be suitable for this aim.

### 5.3.3 Suggestions for Students

$\Rightarrow$ Learn the blended learning potentials: Be cognizant of the potentials and drawbacks of their learning environments and adapt their learning habits or strategies to the needs of blended learning course requirements.

$\Rightarrow$ Learn the functions of blended learning environment: Be aware of the functions of each environment to your learning and use your study time accordingly.

$\Rightarrow$ Participate: Participation is crucial for both environments, which can increase your awareness of the use of both environments and have maximum benefit.

### 5.4 Suggestions for Future Research

This study aimed to investigate and describe student and instructor experiences and their perceptions of course design regarding the use of blended learning environment in a higher education setting. With this scope, it was also aimed to provide an understanding of the enablers and barriers that can help instructors or course designers to highlight the important features of design of blended learning environments. Future research can focus more on design issues for blended learning environments that use different media and technologies. Additionally, studies can take place to investigate the use of authoring tools suggested by Kirkley and Kirkley (2005) in designing and developing blended learning environments.

The New Media Consortium (2008) signified in their horizon report that, "Higher education is facing a growing expectation to deliver services, content and media to mobile and personal devices". This can reveal the need in building the blended learning environments to integrate not only the Internet facilities but also mobile and personal devices and helping instructors building their courses with related technological tools. In this context, Kirkley and Kirkley (2005) suggested mixed and virtual reality, video games and simulations representing the next generation technologies to be used in blended learning environments. Further suggestions can be made for mobile technologies, and

handheld devices. Future studies can investigate blended learning designs that integrate different technologies than online.

The study is conducted with students who had advance skills in computer and Internet use. New studies can be conducted with students who have diverse skills. This is also valid for the course instructor.

The study showed that Merrill's principles of instruction contributed to the framework of the course design. Additional research can be conducted for students' perceptions to these principles' effects in their course implementation. It can also be a subject of study to investigate the impact of other pedagogical approaches and ID models.

Larger sample of participants can be incorporated to future studies for having more statistical inferences on student perceptions and more qualitative analyses on the nature of study context.

In the scope of course design in this study, a local LMS was used. Certain features of this environment might have impact on the experiences and perceptions of participants. Studies can take place to investigate the different uses of LMSs and different online learning environments.

More research is needed for the different aspects of blended learning environments including cost-effectiveness, integration of Web mining, learning processes, and learning outcomes.

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# APPENDIX A

# COURSE SYLLABUS

## MIDDLE EAST TECHNICAL UNIVERSITY

### Department of Computer Education & Instructional Technology

**CEIT 209- Foundations of Computer Aided Instruction**

2006 Fall - Tuesday 11:00 – 13:30 / EFC 104

**Nuray T. GEDİK**

**Office Hours:** Tues 13:40-16:30

**Phone:** 210 3674

**E-mail:** temur@metu.edu.tr

**Course Web Site:** http://ceit209.ceit.metu.edu.tr

## COURSE DESCRIPTION:

In this course, students study historical background and development of Computer Aided Instruction (CAI), and the various concepts associated with CAI. The content of the course include current formats and status of CAI, and principles of software design and development in the broad sense. Throughout the semester, students are encouraged to <u>read established research</u> in the area of CAI, and discuss it in class and online environments.

## COURSE OBJECTIVES:

- express the basic concepts associated with CAI,
- describe the historical background and development of CAI,

- describe the current formats and status of CAI,
- comprehend characteristics of common CAI applications,
- list and explain general design principals,
- be familiar with state-of-the-art design and implementation techniques,
- identify the five stages of instructional design process and their key activities,
- evaluate the models of instructional design that will be used to create effective CAI,
- explain the importance of preparing a manual and documentation for educational software,
- list the features of a good manual and documentation,
- differentiate between formative and summative evaluation,
- comprehend the assessment criteria for educational software evaluation,
- evaluate different types of CAI applications,
- work and solve problems effectively in teams and independently,
- express oneself and share readings and thoughts through class discussions,
- present findings and thoughts in an articulate, clear and intelligible way orally, in writing, and using a presentation tool.

## COURSE OUTLINE:

1) Historical Background of CAI

2) Common Formats of CAI

3) Design Principles of CAI – Initial Planning

4) Planning the Instructional Treatment

5) Evaluation of CAI

6) Screen Design Principles for CAI

7) Programming Languages for CAI

8) Current Status of CAI

## GRADING POLICY:

**Software Evaluation (30 pts):**

You will evaluate sample CAI projects that the instructor will assign you. Check the guideline for your group work. You will also present your evaluations in the class.

**Portfolio (50 pts):**

You will prepare a portfolio throughout the semester including the followings:

1. The presentation report: Write a 2-5 pages report about your presentation topic.
2. Final project report: After the midst of the term, you will prepare a group project till the end of the semester. In this project, you will be assigned creating a CAI project. You will be supposed to prepare the documentation (storyboard, flowchart, manual) of this project. For the portfolio, your project report should include;
    a. The storyboard-flowchart documents of your CAI project
    b. The manual of the project
    c. The theoretical base that was taken into consideration for the project.
    Further details will be provided soon.

3. Assignment documents: Details will be provided soon.

**Attendance & Participation (20+5 pts):**

You will be expected to be an active participant of the lesson and online environment. Attending every session of the course is not enough to guarantee this portion of your grade. This 20 pts will be distributed in accordance with your attendance and participation to lectures, discussions, activities, etc. As you notice you may collect 105 as total point over 100. 5 point is your bonus point in participation.

**! IMPORTANT:** Please avoid plagiarism! It is strictly forbidden in this course. You can follow the link to learn "how to avoid plagiarism" from:

http://www.indiana.edu/~wts/pamphlets/plagiarism.shtml

| Software Evaluation (30): | Presentation<br>Report<br>Discussions |
|---|---|
| Portfolio/ Group Project (50): | The Project Report<br>Presentation of the Project<br>Assignments<br>Discussions |
| Participation / Activities (25) | Online+F2F |

## TEXTBOOKS / READINGS

Roblyer, M.D. (2006). *Integrating Educational Technology into Teaching.* 4th ed. Prentice Hall.

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Price, R. V. (1990). *Computer-aided instruction: a guide for authors.* Pacific Grove, CA: Brooks/Cole Publishing Company.

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Yıldırım, S. (2000). Bilgisayar Destekli Eğitim (BDE) ve Eğitim Yazılımları Değerlendirme İlkeleri.

Yıldırım, Z., & Özden, M.Y. (2001). Student's Perceptions of a Hierarchically-Designed Hypermedia Learning Environment. *Eğitim ve Bilim*, Cilt:26, Sayi: 121, Vol: 26, 66 – 75.

Other reading materials will be assigned and provided in class & online.

# APPENDIX B

# THE SCHEDULE OF THE COURSE WITH A SAMPLE LESSON PLAN

CEIT 209 @ 2006 FALL

## COURSE SCHEDULE

| DATE | IN-CLASS | ONLINE |
|---|---|---|
| **September 26** | First Meeting:<br>CAI: Overview & Historical Perspective | **\* Forum:** Discussion Topic: Scenario 1<br>(Ends: Oct. 3)<br>\* Sample Links to review |
| **October 3** | Applications of CAI – I:<br>  Drills – Tutorials<br>*Assignment*: *Research Paper (1) (Due: Oct 10)* | |
| **October 10** | No class | \* No discussions. But **reading**s on the e-sources menu! |

| DATE | IN-CLASS | ONLINE |
|---|---|---|
| October 17 | Applications of CAI – II: Simulations – Games – Problem Solving – WBL<br>*Assignment : Research Paper (2) (Due: Nov 3)* | * **Forum:** Discussion Topic: "I think..." Reflections for a sample WBL environment<br>(Ends: Oct. 31)<br>* Sample Links to review<br>* Readings on the e-sources menu! |
| October 24-31 | Holiday - No class | Holiday - No class |
| November 7 | The basics of Instructional Design for CAI – I<br>*Assignment: Project Paper1 (Due: Nov                        17)<br>             Research        Paper(3) (Due: Nov 14)* | * **Forum:** Discussion Topic: Scenario 2 (Ends: Nov. 30)<br>* Sample Links to review<br>* Readings on the e-sources menu! |
| November 14 | Guest speaker -Discussion Session | * **Forum:** Discussion Topic: Reflections on the Discussion held (Nov 14-21)<br>* Sample Links to review<br>* Readings on the e-sources menu! |
| November 21 | Guest speaker -Discussion Session<br>*Assignment: Project Paper2 (Due: Dec 5)* | * **Forum:** Discussion Topic (con't)<br>* Readings on the e-sources menu! |
| November 28 | The basics of Instructional Design for CAI - II<br>*(Students are assigned to sample CAI programs to evaluate and present on Dec 19)* | * **Forum:** Discussion Topic: Reflections on the Discussion held (Nov 28-Dec5)<br>* Readings on the e-sources menu! |
| December 5 | Learning Strategies & Techniques for CAI | *Discussion Topic: Final concerns on topics assigned<br>*Discussions on projects<br>* Sample Links to review<br>* Readings on the e-sources menu! |
| December 12 | Student Presentations of Projects (initial) | |
| December 19 | Student Presentations for Software Evaluations | |
| December 26 | Documentation & Summary of course | |
| January 9 | Student Presentations of Projects (final) | No activities online! |

# WEEK 1: First Meeting & Introduction to CAI

**Date:** Sept 26

**The course:**

- In-class:
    - PPT presentation as an introduction to CAI. Content to be covered:
        - What is CAI?
        - Roles of Computers in education
        - History of educational computing activities and resources
    - Orientation Activity: Dividing the class into teams of 4-5-members and requiring each group to write down the advantages and disadvantages of CAI. After that, groups will discuss their ideas on each with the guidance of the instructor.

    - Homework for next week: How is CAI employed in Turkey?
- Online:
    - Discussion (Forum):
        - **Scenario 1:** Mr. Kilic is a teacher in a state K-12 school. He was graduated from Computer Education and Instructional Technology Department. This is his first year in teaching. In his school, there is a new computer laboratory. Before the first teachers' meeting at the beginning of the year, the school principle asked him to provide suggestions of how the computers can be used to improve courses in the courses.
            - What do you think Mr. Kilic can suggest?
            - (Describe the assumptions of Mr. Kilic about the benefits of computer technology for instruction.)
            - What can be the barriers for Mr. Kilic?
        The discussion will end October 3.

    - Web Resources (links): Links to pages of: LOGO web site, Explorations in Learning and Instruction, Edutopia, Fool's Gold, History of Computers and Internet, History of ICT in education, Hobbes' Internet timeline, Riverdeep educational products etc..
    - Readings (E-sources):Week 1 ppt, CAI applications reading, assignment 1 document and guideline

# APPENDIX C

# STUDENT PERCEPTIONS QUESTIONNAIRE

Bu anket, yüz yüze ve çevrimiçi (online) ortamların birlikte kullanıldığı derste yaşamış olduğunuz deneyimlere yönelik düşüncelerinizi öğrenmek amacıyla hazırlanmıştır. Kimlik bilgilerinizi yazmak zorunluluğu olmadığı için vereceğiniz yanıtlar saklı tutulacak ve herhangi bir şekilde sizin değerlendirilmeniz amaçlı kullanılmayacaktır. Bu çalışmaya vereceğiniz içten ve samimi yanıtlarınız için şimdiden teşekkür ederiz.

Araş. Gör. Nuray GEDİK

Doç. Dr. Ercan KİRAZ

Prof. Dr. M. Yaşar ÖZDEN

## A. KİŞİSEL BİLGİLER

**1.** Cinsiyetiniz: ☐ Bay ☐ Bayan

**2**. Bilgisayar-elektronik müfredatlı bir okuldan mı mezun oldunuz?

☐ Evet (Meslek/Teknik lise, vb) ☐ Hayır (Genel Lise, Anadolu/Fen/Öğretmen Lisesi, vb)

**3**. Yaşadığınız yerde (ev, yurt vs.) kullandığınız bilgisayar var mı? ☐ Var ☐ Yok

Eğer varsa, bu bilgisayarın İnternet bağlantısı var mı? ☐ Var ☐ Yok

**4**. Dersin Web sayfasına <u>en çok bağlandığınız üç ortamı</u> sıralayınız. (1-en sık, 2-orta sıklıkta, 3-nadiren)

__ Kişisel bilgisayar

__ Yurt laboratuarları

__ Bölüm bilgisayar laboratuarları

__ Diğer: lütfen belirtiniz : ...................................

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**5.** Dersin Web sayfasını hangi sıklıkta ziyaret ettiniz?

☐ Hiç          ☐ Haftada 1-2          ☐ Haftada 3-4          ☐ Haftada her gün

**6.** Bu derste yaşamış olduğunuz deneyimi tek bir sözcük ile nasıl ifade ederdiniz?
.............................

*Nedenini*                                         *açıklar*
*mısınız?*..................................................................................................................…

..............................................................................................................................................
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**7.** Dersin *Web ortamındaki katılımınızı* nasıl değerlendiriyorsunuz?

☐ Hiç aktif değildim          ☐ Bazen aktiftim          ☐ Çok aktiftim

*Çünkü*.....................................................................................................................................
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....

**8.** Dersin *yüz yüze ortamındaki katılımınızı* nasıl değerlendiriyorsunuz?

☐ Hiç aktif değildim          ☐ Bazen aktiftim          ☐ Çok aktiftim

*Çünkü*.....................................................................................................................................

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....

**9.** Şimdiye kadar kaç tane karma (yüz yüze ve Web ortamı birlikte) ders aldınız?

☐ Hiç          ☐ 1          ☐ 2          ☐ 3 veya daha fazla

**10.** Seçme şansınız olsaydı, bu ders için hangi ortamı tercih ederdiniz?

☐ Yüz yüze          ☐ Web ortamı          ☐ Karma (Yüz yüze ve Web ortamı)

*Çünkü*.....................................................................................................................................

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## B. KARMA ORTAMIN OLASI (MUHTEMEL) OLUMLU ÖZELLİKLERİ

Aşağıda karma öğrenme ortamının bazı özellikleri sıralanmıştır. **CEIT 209 dersindeki karma öğrenme ortamını düşünerek** aşağıdaki ifadelerden size en uygun olanını işaretleyiniz ( ☑ )

| | Kesinlikle Katılıyorum | Katılıyorum | Kararsızım | Katılmıyorum | Kesinlikle Katılmıyorum |
|---|---|---|---|---|---|
| 1. Derse karşı motivasyonum yüksekti. | | | | | |
| 2. Dersteki kaynak ve materyaller zengindi. | | | | | |
| 3. Zengin bir iletişim ve etkileşim ortamı sağlanıyordu. | | | | | |
| 4. Derse (Web ya da yüz yüze ortamlarda) aktif olarak katılabiliyordum. | | | | | |
| 5. Tartışmaların hem Web hem de yüz yüze ortamlarda olması iyiydi. | | | | | |
| 6. Dersin işlenişinde benim isteklerim ve beklentilerim göz önüne alınıyordu. | | | | | |
| 7. Yüz yüze ortam ile Web ortamındaki etkinlikler birbirini destekliyordu. | | | | | |
| 8. Sınıf arkadaşlarımdan (Web ya da yüzyüze ortamlarda) bir şeyler öğrenme olanağı sağlanıyordu. | | | | | |
| 9. Derslerde öğrendiklerimi/düşüncelerimi (Web ya da yüzyüze ortamlarda) ifade edebilme olanağı sağlanıyordu. | | | | | |
| 10. Zamanında dönüt (feedback) alabiliyordum. | | | | | |
| 11. Farklı ders konuları (eğitim, psikoloji, teknoloji vs) ile de ilgilenme olanağı sağlanıyordu. | | | | | |
| 12. Yüz yüze derslerde öğrendiklerimi Web ortamında tekrar etme olanağı sağlanıyordu. | | | | | |
| 13. Web ortamında öğrendiklerimi yüz yüze derslerde tekrar etme olanağı sağlanıyordu. | | | | | |
| 14. Çeşitli öğretim yöntemlerinin (soru-cevap, işbirlikçi öğrenme, forumda tartışma vs.) kullanılmasıyla derse katılımım destekleniyordu. | | | | | |
| 15. Dersteki etkinliklere (proje, ödevler) kendimden bir şeyler katma olanağı sağlanıyordu. | | | | | |
| 16. Yüz yüze ve Web ortamlarındaki değerlendirme birbirini destekliyordu. | | | | | |
| 17. Verilen ödev ve projeleri yapabilmek için çeşitli kaynakları incelemek yoluyla farklı perspektifler geliştirebiliyordum. | | | | | |
| 18. Derste öğrendiğim bilgileri çeşitli aktivitelerle (proje, ödev, vb) uygulama şansı buluyordum. | | | | | |
| 19. Yaptığım aktivitelerde gerçek hayatta karşılaşabileceklerime yönelik dönütler alabiliyordum. | | | | | |
| 20. Öğretim elemanı karma ortamı iyi kullanıyordu. | | | | | |
| 21. Öğretim elemanıyla (Web ya da yüz yüze ortamlarda) iletişim ve etkileşimim verimliydi. | | | | | |
| 22. Sınıftaki diğer arkadaşlarla (Web ya da yüz yüze ortamlarda) etkileşim ve iletişimim verimliydi. | | | | | |
| 23. Karma öğrenme ile kendi öğrenme yöntemlerimi (okuma, dinleme, anlatma, uygulama, tartışma, vs) kullanabileceğim bir ortam sağlanıyordu. | | | | | |

## C. KARMA ORTAMIN OLASI (MUHTEMEL) OLUMSUZ ÖZELLİKLERİ

Aşağıda karma öğrenme ortamında karşılaşılabilecek bazı zorluklar sıralanmıştır. **CEIT 209 dersindeki deneyimlerinizi düşünerek** aşağıdaki ifadelerden size en uygun olanını işaretleyiniz ( ☑ )

| | Kesinlikle Katılıyorum | Katılıyorum | Kararsızsım | Katılmıyorum | Kesinlikle Katılmıyorum |
|---|---|---|---|---|---|
| 1. Ders için yeterli motivasyonum yoktu. | | | | | |
| 2. Karma ortam öğrenme yöntemlerime (okuma, dinleme, anlatma, uygulama, tartışma, vs) uygun değildi. | | | | | |
| 3. Dersin Web sayfasını kullanırken teknik sorunlar yaşadım. | | | | | |
| 4. Dersin Web sayfasını kullanma konusunda yeterli teknik destek sağlanmıyordu. | | | | | |
| 5. Yüz yüze ve Web ortamı birlikte olunca çok zaman kaybı/sorunu oluyordu. | | | | | |
| 6. Karma öğrenme ortamı bu dersin içeriğine uygun değildi. | | | | | |
| 7. Dersteki etkinlikler ve materyaller zengin değildi. | | | | | |
| 8. Web ortamı ile yüz yüze ortam arasında uyumsuzluk/kopukluk vardı. | | | | | |
| 9. Yüz yüze ortamdaki etkinlikler (tartışma, konuk sunumları, grup etkinlikleri vs) yetersizdi. | | | | | |
| 10. Web ortamındaki etkinlikler (tartışma, araştırma, duyurular, dökümanlar vs) yetersizdi. | | | | | |
| 11. Hem Web ortamı hem de yüz yüze ders aktivitelerinin olması ders yükünü artırıyordu. | | | | | |
| 12. Yüz yüze ve Web ortamlarındaki değerlendirme birbirini desteklemiyordu. | | | | | |
| 13. Yeterli miktarda dönüt (feedback) alamıyordum. | | | | | |
| 14. Zamanında dönüt alamıyordum. | | | | | |
| 15. Öğretim elemanı karma ortamı iyi kullanamıyordu. | | | | | |
| 16. Öğretim elemanıyla (Web ya da yüz yüze ortamlarda) verimli iletişim ve etkileşimim olmadı. | | | | | |
| 17. Sınıftaki diğer arkadaşlarla (Web ya da yüz yüze ortamlarda) verimli iletişim ve etkileşimim olmadı. | | | | | |
| 18. Ders içeriği (Web ya da yüz yüze ortamlardaki sunumlar, dökümanlar, kaynaklar vs.) ile verimli etkileşimim olmadı. | | | | | |

## D. GÖRÜŞLER

1. CEIT 209 dersindeki deneyimlerinizden yola çıkarak, karma öğrenme ortamlarının ders konularını öğrenmenizde *en çok katkısı* olduğunu düşündüğünüz hususlarını açıklar mısınız?

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2. Yine deneyimlerinizden yola çıkarak, karma öğrenme ortamlarının *zorluklarını* açıklar mısınız? (Dersi öğrenmede karma ortamdan kaynaklanan zorluklardan bahsedebilir misiniz?)

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3. Dersteki karma öğrenme ortamının daha etkili hale getirilmesi için önemli olduğuna inandığınız önerilerinizden <u>üç</u> tanesini gerekçeleriyle yazar mısınız?

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4. Bundaki sonraki derslerinizde karma ortam kullanılmasını ister misiniz?  Neden?

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5. Geleceğin öğretmenleri olarak, gideceğiniz okullarda karma ortamda ders verip-vermeme konusundaki düşüncelerinizi yazar mısınız?

☐ Verirdim. Çünkü,
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.........................................................................................................................................

☐ Vermezdim. Çünkü,
.........................................................................................................................................
.........................................................................................................................................

6. Karma ortam kullanılması için sizce hangi koşulların olması gerekir?

1.

2.

3.

<p align="center">Araştırmaya katılımınız için çok teşekkür ederiz ☺</p>

# APPENDIX D

# STUDENT PROFILE QUESTIONNAIRE

## A. KİŞİSEL BİLGİLER

**1.** Adınız: ...............................................................

**2.** Cinsiyetiniz: ☐ Bay ☐ Bayan

**3**. Yaşınız: .........

**4**. Mezun olduğunuz lise:☐ Anadolu/Fen Lisesi ☐ Meslek Lisesi ☐Genel Lise ☐ Diğer

**5**. Yaşadığınız yerde (ev, yurt vs.) kullandığınız bilgisayar var mı? ☐ Evet ☐ Hayır

**6.** Eğer 5.soruya "evet" cevabı verdiyseniz bilgisayarınızın İnternet'e bağlantısı var mı?

☐ Evet ☐ Hayır

**7**. Seçme şansınız olsaydı, bu ders için hangi ortamı tercih ederdiniz?

☐ Geleneksel (sınıf) ☐ Çevrim-içi (Online) ☐ Karma (Geleneksel ve çevrim-içi)

*Çünkü*

..................................................................................................................................

...........................................................................................................................................

..................................................................................................................................

...............................................................................................................................

**8**. <u>Ders saatleri dışında</u> bu derse yönelik haftalık ne kadar süre ayırmayı planlıyorsunuz? Niçin?

..................................................................................................................................

..................................................................................................................................

...............................................................................................................................

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**9**. Bu derse yönelik beklentilerinizi ve düşüncelerinizi açıklayınız.

...................................................................................................................................................

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**10.** Ders konularını öğrenirken (ders ortamında ve Web ortamında) kendinizde güçlü ve zayıf olduğunu düşündüğünüz yönlerinizi tanımlayınız.

*Ders ortamında* .............................................................................................................................

*Web ortamında* .............................................................................................................................

**B. Lütfen aşağıdaki maddelerden sizin için en uygun olan seçeneği işaretleyiniz.** ☑

| Aşağıda belirtilen durumlar için rahatlık düzeyiniz nedir? | Oldukça Rahatım | Rahatım | Kararsızım | Rahat Değilim | Hiç Rahat Değilim |
|---|---|---|---|---|---|
| **1.** Derste hocaya sorular yöneltirken | ☐ | ☐ | ☐ | ☐ | ☐ |
| *"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.* | | | | | |
| **2.** İnternet ortamında hocaya sorular yöneltirken | ☐ | ☐ | ☐ | ☐ | ☐ |
| *"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.* | | | | | |
| **3.** İnternet ortamında sınıf arkadaşlarıma sorular yöneltirken | ☐ | ☐ | ☐ | ☐ | ☐ |
| *"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.* | | | | | |
| **4.** İnternet ortamındaki ders materyallerini kullanırken | ☐ | ☐ | ☐ | ☐ | ☐ |
| *"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.* | | | | | |

| **5.** Sınıf arkadaşımdan ders ile ilgili konularda yardım isterken | ☐ | ☐ | ☐ | ☐ | ☐ |

*"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.*

| **6.** Yüzyüze derste grup çalışması yaparken | ☐ | ☐ | ☐ | ☐ | ☐ |

*"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.*

| **7.** İnternet ortamında grup çalışması yaparken | ☐ | ☐ | ☐ | ☐ | ☐ |

*"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.*

| **8.** Sınıf içinde sunum yaparken | ☐ | ☐ | ☐ | ☐ | ☐ |

*"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.*

| **9.** Sınıf arkadaşıma ders ile ilgili konularda yardımcı olurken | ☐ | ☐ | ☐ | ☐ | ☐ |

*"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.*

| **10.** Düzenli olarak dersin web sayfasını takip ederken | ☐ | ☐ | ☐ | ☐ | ☐ |

*"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.*

| **' 11.** Ders konularında makaleler okurken | ☐ | ☐ | ☐ | ☐ | ☐ |

*"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.*

| **12.** Farklı kaynaklardan (kütüphane, İnternet) yararlanarak proje / ödev hazırlarken | ☐ | ☐ | ☐ | ☐ | ☐ |

*"Rahat değilim" veya "Hiç rahat değilim" seçeneklerini işaretlediyseniz, lütfen sebeplerini açıklayınız.*

\* Konuyla ilgili eklemek istedikleriniz varsa lütfen yazınız.

**Anket bitmiştir. Zaman ayırdığınız için teşekkür ederim.** ☺

# APPENDIX E

# THE STUDENT INTERVIEW GUIDE I (PRELIMINARY STUDY)

Date.....................................:

Duration.............................:

Name of the Interviewee.....:

Hello, my name is Nuray Temur . I am conducting a study on experiences of the students and the perceptions of them on those experiences to understand student behavior in a blended learning environment. For this study, the traditionally designed course, CEIT 209 Computer Aided Instruction (CAI), will be designed in a blended delivery format. Before designing this blended environment, I am interested in current practices. Therefore, this interview is being conducted to get your input about the "Computer Aided Instruction" (CAI) course you have taken in previous semester. I am especially interested in your experiences, any problems you have faced and recommendations you have.

I would like to tape record our conversation. The purpose of this is so that I can get all the details. Is it okay with you?

I assure you that all your comments will be kept confidential. Do you have any questions?

1) I would like to start by having you briefly explain what your expectations were before taking the CEIT 209 course. Were your expectations met?
2) How was your experience on the delivery of the CAI course?
   a) Course organization (for the whole term)
   b) Course activities/ assignments (weekly, daily, throughout the semester)
   c) Motivation (intrinsic, extrinsic)
   d) Interactivity (with the teacher, with the peers, with other course related staff)

e)     Instructor support (Classrom management, communication style, guidance)

3) How many hours in a week did you approximately spend for this lesson?

4) What did you enjoy most about the class?

(What made you feel so?)

5) Did you encounter any problems / barriers regarding the delivery of the course? Can you give examples?

6) What do think about the teaching strategies involved in the course?

(What strategies did the instructor employ to get you participate in the course at a meaningful level? Have they been effective for your learning? What things would you change?)

7) How was your role as a learner?

8) Are there any advantages / disadvantages about studying in this environment (your classroom)?

9) How would the course be improved?

(Could you please list three things (if any) the instructor could do to improve the instruction for this course?)

(Do you have any suggestions regarding the delivery of the course?)

10) Finally, imagine that you could take this course online supported. How would you feel about that opportunity?

Is there any other information you think would be useful for me to know or you would like to add? Thank you.

# APPENDIX F

# THE STUDENT INTERVIEW GUIDE II

Merhaba. Bu görüşmenin amacı geçen dönem almış olduğunuz "Bilgisayar Destekli Öğretim" dersi ve kullandığınız karma öğrenme ortamı ile ilgili görüşlerinizi öğrenmektir. Bu ders ile sahip olduğunuz deneyimleri, yaşadığınız zorlukları ve önerilerinizi benimle paylaşırsanız çok sevinirim.

Sakıncası yoksa görüşmeyi kaydetmek istiyorum. Bu şekilde görüşmeden sonra yanıtlarınızı daha iyi analiz edebilirim. Bu görüşme boyunca söylediğiniz herşey gizli kalacaktır. Elde edilen bilgiler hiçkimseye iletilmeyecektir ve açıklanan hiçbir bilgi üzerinde isminiz belirtilmeyecektir.

Bu araştırmaya katılmayı kabul ettiğiniz ve zaman ayırdığınız için teşekkür ederim.

1. **Bildiğiniz gibi karma öğrenme ortamları Web ortamı ile yüz yüze derslerin bir arada olduğu ders ortamlarıdır. Daha önce karma ortamda herhangi bir ders almış mıydınız?**

**EVETSE:**

      i. Web ortamını hangi amaçlarla kullanmıştınız?

      ii. Peki bu derslerde yaşadığınız zorluklar ve kolaylıklar hakkında neler söyleyebilirsiniz? Neden?

2. **Ders Süreci:**
   a. 209 dersinden biraz bahsedebilir misiniz? Nasıl bir dersti? Yapılan etkinliklerden kısaca bahsedebilir misiniz?
   b. Haftada ne kadar zamanınızı bu ders için ayırıyordunuz?

i. Web ortamında ne kadar zaman harcıyordunuz?

ii. Yüz yüze dersler için ne kadar zaman ayırıyordunuz?

c. Aldığınız derslerde Web ortamını hangi amaçlarla kullanmak istersiniz / kullanırsınız?

i. Bu derste Web ortamını hangi amaçlarla kullandınız?

d. Yüz yüze derslerde neler yaptınız?

i. Bu etkinlikler hakkında neler düşünüyorsunuz?

e. 209 dersinin hem yüz yüze hem de Web ortamının olduğu bir karma ortamda yürütülmesi hakkında neler düşünüyorsunuz? Neden?

f. Web ortamının en çok hangi özelliklerini kullandınız? Neden?

i. Forum hakkında neler düşünüyorsunuz?

1. Görüşlerinizi rahatlıkla yazabildiniz mi? Neden?

2. Sınıf içi (yüzyüze) ortama kıyasla forumda görüş belirtmek hakkındaki düşünceleriniz nelerdir? Farkları neler oldu?

ii. Web ortamındaki hangi bilgi/etkinliklerden yararlandınız?

1. Bunlardan bahsedebilir misiniz?

2. **Yararlanmadım:** Neden?

iii. Sistemi kullanırken yaşadığınız sorunlar nelerdi? Bu sorunları nasıl çözdünüz?

g. Web ortamı ile yüz yüze derslerin birbirlerine etkileri oldu mu? Bunlar nelerdi?

i. SONDA: Yani, Web ortamının yüz yüze derslere ne gibi etkileri oluyordu? Neden?

ii. SONDA: Yüz yüze derslerin Web ortamında öğrendiklerinize/uyguladıklarınıza ne gibi etkileri oluyordu? Neden?

h. Dersin hocasının sınıf içindeki rolleri nelerdi? Web ortamındaki rolleri nelerdi?

i. Bir öğrenci olarak, sizin dersteki rolleriniz nelerdi? SONDA: Derse katılımınız nasıldı?

ii. Derse sınıfiçi katılımınız ile Web ortamındaki katılımınız arasında farklılıklar var mıydı? Neden?

       i.  Bu dersteki karma ortamın (sınıfiçi dersin Web ile desteklenmiş hali) etkinliği hakkında neler düşünüyorsunuz?

            i.  *Bu derste en çok beğendiklerinizden biraz bahsedebilir misiniz?*

           ii.  *Bu derste en beğenmediklerinizden bahsedebilir misiniz?*

          iii.  *Bu derste en çok zorlandıklarınızı sıralar mısınız?Neden?*

**3. Ders Bitimi:**

    a.  Bu derstekine benzer karma ortamın diğer derslerde de kullanılması hakkında neler düşünüyorsunuz?

    b.  Eğer dersi siz veriyor olsaydınız, karma ortam kullanır mıydınız? Evet ise, bu karma ortamı daha etkin hale nasıl getirmek için neler yapardınız?

Görüşme soruları burada bitiyor. Eklemek/sormak istediğiniz birşey var mı? Görüşme notlarımı daha sonra sizinle paylaşıp görüşlerinizi doğru yansıtıp yansıtmadığı hakkında görüşlerinizi alabilir miyim? Teşekkürler.

# APPENDIX G

## STUDENT WEEKLY REFLECTION TEMPLATE

Adı –Soyadı: ......................................

<div style="border:1px solid black">... / ... / 2006</div>

**BU HAFTA İZLENİMLERİ**

Bu hafta ders konularını öğrenirken en çok katkısı olduğunu düşündüğüm aktivite...
(nedenlerini lütfen belirtiniz)

_____
_____
_____
_____
_____
_____

Bu hafta ders konularını öğrenirken yaşadığım en önemli sorun ....(nedenlerini lütfen
belirtiniz)

_____
_____
_____
_____
_____
_____

| 1 | Bu hafta ders için yapmam gerekenler açısından ders yükünün uygun olduğunu düşünüyorum.. | **Kesinlikle Katılmıyorum** ◯ | **Katılmıyorum** ◯ | **Fikrim Yok** ◯ | **Katılıyorum** ◯ | **Kesinlikle Katılıyorum** ◯ |
|---|---|---|---|---|---|---|
| | *Lütfen sebeplerini açıklayınız* | | | | | |
| | | | | | | |
| 2 | Yüz yüze derslerin öğrenmeme katkısı olduğunu düşünüyorum. | **Kesinlikle Katılmıyorum** ◯ | **Katılmıyorum** ◯ | **Fikrim Yok** ◯ | **Katılıyorum** ◯ | **Kesinlikle Katılıyorum** ◯ |
| | *Lütfen sebeplerini açıklayınız.* | | | | | |
| | | | | | | |
| 3 | İnternet ders ortamının öğrenmeme katkısı olduğunu düşünüyorum. | **Kesinlikle Katılmıyorum** ◯ | **Katılmıyorum** ◯ | **Fikrim Yok** ◯ | **Katılıyorum** ◯ | **Kesinlikle Katılıyorum** ◯ |
| | *Lütfen sebeplerini açıklayınız.* | | | | | |
| | | | | | | |

# APPENDIX H


# INSTRUCTOR DIARY TEMPLATE


The Worksheet for Reflecting Instructor Experiences in Classroom Activities

../.. / 2006

- What knowledge was students be learning?? Did they recall prior knowledge?


- Were the students interested?? How did you arouse interest?


- What problems occured?? What kind of solutions did you employ to overcome these problems??


- What were the enablers during the class for the activities? Why?


- What strategies would make instruction better in class?

The Worksheet for Reflecting Instructor Experiences in Online Activities:

What knowledge was students be learning?? Did they recall prior knowledge?

- Were the students interested?? How did you arouse interest?

- What problems  occured?? What kind of solutions did you employ to overcome these problems??

- What were the enablers of the online activities? Why?

- What strategies would make instruction better in online environment?

# APPENDIX I

# PEER INTERVIEW GUIDE

Merhaba. Bu görüşmenin amacı geçen dönem katılımcı ve gözlemci olduğunuz "Bilgisayar Destekli Öğretim" dersi ve kullanılan karma öğrenme ortamı ile ilgili görüşlerinizi öğrenmektir. Dönem boyunca sahip olduğunuz deneyimleri, gözlemlerinizi ve önerilerinizi benimle paylaşırsanız çok sevinirim.

Sakıncası yoksa görüşmeyi kaydetmek istiyorum. Bu şekilde görüşmeden sonra yanıtlarınızı daha iyi analiz edebilirim. Bu görüşme boyunca söylediğiniz her şey gizli kalacaktır. Elde edilen bilgiler hiç kimseye iletilmeyecektir ve açıklanan hiçbir bilgi üzerinde isim iniz belirtilmeyecektir.

Bu araştırmaya katılmayı kabul ettiğiniz ve vakit ayırdığınız için teşekkür ederim. Sormak istediğiniz herhangi bir soru var mı?

4. **Giriş :**

   Bildiğiniz gibi karma öğrenme ortamları Web ortamı ile yüz yüze derslerin bir arada olduğu ders ortamlarıdır. Daha önce karma ortamda herhangi bir ders verdiniz mi? EVET:

         i. Web ortamını hangi amaçlarla kullanmıştınız?

         ii. Peki bu derslerde karma ortamı kullanmak size ne gibi kolaylıklar sağladı? Neden?

         iii. Karma ortam nedeniyle ne gibi zorluklar yaşadınız?

   HAYIR: Bu dersteki karma ortama benzer bir ders almış mıydınız? (ve yukarıdaki sorular)

5. **Ders Süreci:**

       a. 209 dersinden biraz bahsedebilir misiniz? Nasıl bir dersti? Yapılan etkinliklerden kısaca bahsedebilir misiniz?

       b. Yüz yüze derslerde ne gibi etkinlikler yapılıyordu? Grup çalışmaları? Konuk sunumları? PPT Sunumları? Öğrenci sunumları? Sizce dersin hocasının yaşadığı en büyük zorluklar neler oldu?

       c. Web ortamında ne gibi etkinlikler vardı? Bunlar hakkındaki görüşlerinizi öğrenebilir miyim?

           i. Dersin hocasının üstlendiği görevler neler oldu? Bunları gerçekleştirirken onun işini kolaylaştıran şeyler nelerdi?

      **ii.** Yaşadığı güçlüklerden bahsedebilir misiniz?

      **iii.** Bu güçlükleri aşabilmek için neler yaptı? Başarılı oldu mu? Nasıl?

d. Sizce bu derste Web ortamının hangi özellikleri derse faydalı oldu? Neden?

e. Yüz yüze dersin hangi özellikleri ders faydalı oldu?

f. Özellikle karma ortamının "tasarımı"nı düşündüğünüzde sizce dersin hocası ne gibi sıkıntılar yaşamıştır? Ne gibi hususlar onun için olumlu oldu?

g. Dersin hocasının sınıf içindeki rolleri/görevleri nelerdi?

      i. Sizce bu roller Web ortamı ile örtüşüyor muydu? Ne gibi aksaklıklar/zorluklar yaşadı?

h. 209 dersinin hem yüz yüze hem de Web ortamının olduğu bir karma ortamda yürütülmesi hakkında neler düşünüyorsunuz? Neden?

i. Bu dersteki karma ortamın (sınıfiçi dersin Web ile desteklenmiş hali) etkinliği hakkında neler düşünüyorsunuz?

      i. *Bu derste en çok beğendiklerinizden biraz bahsedebilir misiniz?*

      ii. *Bu derste en beğenmediklerinizden bahsedebilir misiniz?*

      iii. *Dersin değerlendirme sürecinde ne gibi sıkıntılar yaşandı? Karma ortamın değerlendirilmesinde ne gibi kolaylıklar yaşandı?*

**6. Ders Bitimi:**

a. Eğer dersi siz veriyor olsaydınız, bu karma ortamı daha etkin hale nasıl getirmek için neler yapardınız?

Görüşme soruları burada bitiyor. Eklemek istediğiniz birşey var mı? Teşekkürler.

# APPENDIX J

# PRELIMINARY STUDY RESULTS

*Pedagogical Approach:*

The students mentioned both student-centered and instructor-centered approaches in the course. In the student-centered approach, all students mentioned about the activities of project assignments that necessitated responsibility on their progress. One student (S3) remarked that:

> ... I did not know I needed to work this hard to find information and take all responsibility on my own for my part of the project. It was a difficult activity but very helpful at the end...

Three interviewees (S2, S3, and S5) revealed that the student- centered instruction was very helpful for them and they enjoyed the class sessions with good communication style of the instructor. S5 said that "The class hours were very natural for me and was very enjoyable". S2 stated the reason of this as:

> We were having courses by ourselves with the guidance of our instructor. Initially the instructor told his ideas on the subject, and then we were discussing about them. We did not learn all of our subjects like that, but I remember all the subjects that are delivered in this way.

Except for the student projects, the instruction in class sessions was mostly instructor-centered. The course instructor explained the reason as:

> Since the content of the course included basic information, I needed to be lecturing to introduce and explain the content. I tried to embed student-centered activities, but I can tell that my instruction was mostly driven by an instructor-centered approach.

One student (S2) remarked that the courses were done in a friendly and warm atmosphere. They say that they were satisfied with instructor's lecturing. On the other hand, S4 stated that sometimes it was boring to have instructor-centered instruction. In addition, the instructor stated that since the number of students taking the course was huge, it was very difficult for him to engage all students to the course by saying:

> The class size is really too much for such a course. I like lecturing when I involve all students to the course. But this course is very demanding in terms of knowledge and skill development and even though I tried my best, it was sometimes impossible to involve them all and support when needed.

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There was also teaming approach for discussions that were designed for students to discuss certain topics together in class. These discussions were helpful exercises, in which they had the chance of studying concepts together within teams and discuss together in class. These group works were satisfactory for all student interviewees. They believed that with a student-centered approach, they had a better opportunity to learn and attend classes. This "*provided an encouraging way of learning*", S2 remarked. However, two students (S4 and S5) argued that they were not taking active part in the teams since the other group members were very dominant and it was hard for them to say a word.

*Course Organization:*

The interviewees were asked about their experiences and perceptions about the general organization of the course and the activities. There were two major categories in this theme: in-class activities and off-class activities.

For the in-class activities, two interviewees mentioned about the instructor's lecturing. S1 stated that the instructor initially revised the previous lessons at the beginning of the course. S2 remarked that the courses were done in a friendly and warm atmosphere. All the interviewees mentioned about the group working in the class sessions. These were helpful exercises, in which they had the chance of studying concepts together within teams and discuss together in class. Another activity that S1 mentioned was the seminars that the experts gave to them during the course. He stated that; "*Those people provided us to see what is going on outside of the school*". All students were very satisfied with the expert seminars.

For the off-class activities, students were engaged in weekly assignments and semester works. S2 and S5 divided these works into two categories as educational and technical and use those labels while explaining certain assignments. S5 stated that weekly assignments were educational, but the semester assignment was technical. Being once an undergraduate student in this department, the researcher viewed this situation as a tradition of the students of this department to label courses as educational or technical. This may be due to the curricular differences in their courses from different departments like Educational Sciences, Computer Engineering, or CEIT etc. For their weekly assignments, they were supposed to read the lecture notes that the instructor gave to them, and find out topics to discuss within the class. S4 indicated that they also had once an assignment in which they were supposed to learn the meanings of certain terminology.

During the semester period, students were supposed to prepare a project, evaluate educational software, and read and reflect on a scientific book. The project was a group work with 4 members. In this project, the students prepared educational software for any level of students that they choose. For the process of this project, S1 indicated that he had a pre-planning period with his group and they also benefited from expert opinion in this period. S1 and S2 mentioned about the pilot testing of their projects. S1 stated that the feedback they received was very satisfactory. He was very happy while indicating this experience and it was obvious in the interviews that the project was a big deal for the other interviewees as they all mentioned about their experiences for the project. Two interviewees articulated that by doing this project, they had a technical background for their future courses. S4 stated that "*I could improve my technical abilities with the help of CEIT209 course. It was a success for me*". After finishing the project, the students presented their projects in the class and other instructors attended those presentations. S2 stated that some experts were also invited but they could not come.

For evaluating the educational software, the instructor remarked that the students worked in groups of 4, each member evaluating one of the four types of software. The last activity that the interviewees mentioned was reading and reflecting a book preferably from Tubitak popular science series. S2 expressed that it was an effort of the instructor for increasing their scientific culture. S3 pointed another concern that, "*Reading books helped us, because by this way the instructor challenged us to attend to classes*".

The high school that the students graduate from played an important role for the technical knowledge of the students of this department. Students from technical and vocational high schools have some technical computer knowledge. On the other hand, most of the students graduated from classical high schools or Anatolian-Science schools have poor knowledge or no knowledge at all. S3 remarked this fact since she was graduated from Anatolian High School. She states this by saying;

> *I had trouble while preparing the project. It may be due to our lack of a technical background, while the instructors expect us too much on this. They do not teach us any course for preparing software…*

For the content of the course, S1 stated that he found it successful. S2, S3 and S5, however, indicated that the content of this course overlapped with the other courses they take that semester. According to S2 and S3 this was a reason for them to get bored of the class sessions sometimes.

For the general organization of the course, S1 stressed that being both theoretical and practical instead of being only theoretical was a good qualification of the course organization. For S2, technical problems they had was an obstacle for this course. The course instructor complained about the lack of time in class sessions for demonstrating examples and helping students have longer time on collaborating or discussing examples and issues. S3 noted more on content overlaps in addition to technical problems. According to S4 and S5, the course organization was appropriate to improve their skills.

*Motivation:*

When asked the motives and incentives, student interviewees mentioned both positive and negative issues. For the positive motives, all students mentioned instructor support and encouragement. Having a technical assignment was a good deal for S1 who had taken technical courses from another department before. He remarked that preparing a project and moving from theory to practice and learning new things were good experiences for him to be motivated. For learning new things, S2 also stated the similar idea. S2 also stressed on project presentations and to her, experts who came to class to share experiences and were supposed to come to project presentations were the most important to be motivated. For S3, when the delivery of the courses were student centered, that is having group works and discussions together, the course was enjoyable. S4 and S5 also regarded the course as enjoyable. What S4 pointed out for this theme was interesting: He said that he had the chance of having new friends with the help of project work and this was very motivating for him.

Two interviewees mentioned about their experiences on negative motives of this course. According to S3, when the instructor was just using direct instruction in the class hours, it was very boring and demotivating for her. Therefore, she preferred group works and discussion sessions. Another negative motive was alluded by S5. *"The instructor had different characteristics in class and out of the class… When I intend to ask question about the class subject or project, I was affected by his face look."* he said.

*Interaction:*

Interaction between student-instructor and among students is a challenging part of a course that affects its effectiveness. In the 209 course, interviewees mentioned about interaction with its positive and negative factors.

For student-student interaction, the instructor remarked that he aimed to support student-student interaction within groups via projects and among groups via in-class discussions. S1 and S2 talked about their project experiences regarding student-student interaction. While doing the project, S1 stated that students were communicating within groups, but very little with other groups. Therefore, their interaction was limited to their project group members. According to S2, because of the technical background differences, there were problems within groups on the workload. That caused problems among members of groups. Other interviewees (S3, S4, and S5) said that there were not any problems among students. S3 asserted a communication language ease. They were using Turkish, which increased student contribution in the classes. S4 and S5 indicated that with the group works and instructor's positive attitudes, there was a positive interaction among students.

All of the interviewees believed that there was a positive interaction between instructor and students. The instructor stated that he was satisfied with his performance regarding interaction with students by saying:

> *First of all I like teaching. I like interacting with students and I believe I learn a lot from them during a course while they are learning from me. I am open to any ideas and opinions which makes it easier to interact with students. I think I had a great semester with students in terms of interaction.*

S1 and S5 also remarked that with instructor help, they could interact with people from practice areas: experts and other school members. As the studies of this department heavily based on educational projects, there is a need for communicating with staff in practice areas. The group project provided a base for students to get acquainted with those staff.

Regarding the student-content and student-TA interaction, the interviewees did not mention much. The instructor stated that TAs were responsible for mainly assignments which made the interaction limited. For the student-content interaction, the instructor stated that:

> *The students do not read. As it is usual! This is why I made the reading assignment part of grading to make them read and reflect. I gave reading assignments, but not many read them I am sure.*

*Instructor Role:*

During the interview, the interviewees were asked about their opinions about instructor role and support. They were prompted to express their ideas within three categories: classroom management style, communication style, and guidance.

For classroom management, S1 stated that the instructor was assigning reading and research assignments, which made them active in the courses. All students stated that he had good control in class and could be able to manage even the most problematic situations. He had positive attitudes and communication style. According to S5, the instructor was active, disciplined but funny at the same time. Those expressions for the instructor can be regarded as being an authoritative instructor. According to all of the

interviewees, the instructor had a positive interaction as it is mentioned in the motivation category. S3 and S4 indicated that the instructor was guiding them both within class and out of the class. The instructor noticed that he had a positive attitude and tried his best to support students. However, it was sometimes hard to manage all components of the course regarding the logistics like announcements or assignments. He noted that:

> "*Especially announcements. Sometimes, I needed to make some changes on the timeline of projects or assignments. And it was becoming a problem since some were complaining that they did not know, or they did not come to class that day, or some even complained that they did not hear such a thing!*"

<u>Student Role:</u>

The students had both active and passive roles throughout the semester. Three of the student interviewees (S1, S2, and S3) felt themselves in the active side. For S1, this was due to his motivation on the course. It seems that the extrinsic motivation of the course provided such impression on S1. He declared that putting their real life experiences forward made the lessons more meaningful for him. With their comfort in explaining their ideas during the interviews, S2 and S3 seemed very self-confident; that is, being active students may be the result of their intrinsic motivation.

S4 and S5, on the other hand, did not seem self-confident during the interviews and they already stated that they were usually at the passive sides in the lessons. S4 indicated that he had anxiety in classes. He was afraid of being unable to explain his ideas in front of a huge community. When they are asked about their suggestions to get over from this problem for this course, S4 said that when he is with friends, or in groups, it was easier for him to attend. S5 has a different position for this. According to him,

> "*If more technical content was included in the course, more students could attend to lessons. Since more verbal and educational content was in the focus of the curriculum of the course, students could not be interested in the course much*".

Additionally, to figure out the individual efforts of the students, students were asked to reflect on their individual studies in the weekly basis. All of them mentioned about project work. They had group meetings for those projects later in the semester. S2 and S3 pointed out that they had good time with their friends during the project. Another thing was preparing reports for the project. S2 was doing that instructional part of the project since she had inadequate knowledge on technical part. However, S1 and S4 stated that they studied to learn about the technical part themselves.

Another individual work was summarizing and reflecting on a reflecting a book preferably from Tubitak popular science series. "*It helped us to inquire on our works and projects in an objective way*" said S1. They were also supposed to read certain articles that the instructor assigned before coming to class. Almost all students stated that it was hard to read them all. One more thing that they did was evaluating educational software and presenting the results in class. S3 stated that:

> We had so many roles for this course. Being a team member for project and presentations, working on readings individually and so on. Responding to instructor questions in class.. Oh it was a tiring semester!

According to S4, he had improved himself technically by doing the project, and had a background for educational software development which would serve for his next

courses. S1 believed that the course became more meaningful by doing the project for him to see how theoretical knowledge can practically be done.

*Suggestions:*

When the interviewees were asked to propose their opinions on how to improve the course, they provided a lot of suggestions. This data would be very helpful while redesigning the course, since it was the evaluation of the course within the students' eyes.

S3 had a suggestion on the content of the course. She indicated that as it overlapped with other courses and they had difficulties in technical works, it would be better to reorganize course offerings of the theoretical courses and application-based courses. She also suggested adding laboratory hours for the course and having course hours fully student-centered. She revealed:

> Sometimes we had lessons with lecture method. [Instead of this] it would be very nice to do the whole lessons with discussions. When we covered the concepts discussing with our friends, not looking at the face of the instructor fully, we were more comfortable to talk and discuss about the subject.

For S4, more group works in which he can work with close friends would be helpful for him. This can be due to his anxiety in front of the class and community. In fact, they need to get away from this anxiety, as they are prospective teachers. S5, graduated from a vocational and technical high school, proposed somehow a more technical content for the course.

When asked their perceptions on how blended learning environment would fit for this course, the course instructor stated all positive comments:

> It is exactly what is needed for the improvement of this course. The course needs to be supported with a Web component, not only for delivering resources, but also for expanding the course into online environment with active discussions, demonstrations, expert support, or even better instructor support. I am sure student participation and involvement onto course would increase as well.

When the students were asked whether they know what blended learning means, only two interviewees (S1 and S4) stated that they did. This would be both advantageous and disadvantageous for the researcher. It would be an advantage since the interviewees can think and imagine without any limited thinking resulted from a blended learning experience. However, it would be disadvantageous since the interviewees might not imagine anything on this as they had no experiences. When the data is examined for the interviews, the researcher probably had the both! The first interviewee (S1) is taking the biology course, which was given in a blended format since he was an irregular student. According to him, a blended learning environment would be very helpful for doing higher quality projects, as there would be an ongoing interaction. S5 mentioned that the interaction and communication would be faster. S2 had a negative attitude to integrate any more technical work since she did not like the term.

The suggestions of the interviewees for the blended learning environment were mainly on the material and content support (S1, S3, and S4), faster communication (S5) via forums and chats, online announcements, assignments and even tests (S4). As a further suggestion, S1 stated that the instructor would have meeting hours with the students once a month of once in fifteen days, but full-time interaction via online. There would also assistant or expert support in online environment.

# APPENDIX K

# USABILITY TEST RESULTS

Usability test period included a user test and expert analysis. Once user test has been conducted, they were analyzed in an iterative process to reveal what needed refinement and change. The analysis results are presented regarding the measurements of Calongne (2001) as in the following:

- **How long does it take for each page to load?** The time needed for page load was optimum. None of the users had problems.

- **How responsive is the system to a user's request?** This item is mainly covered within the context of content of the web site. When the users searched for specific information and investigated the site, they stated that what they found their demands responded.

- **Does the user go to the wrong web pages when seeking specific information?** This was a problem for some users to link to the wrong pages while searching for information for in order to complete the third and ninth scenarios especially. They were problems due to the location of documents and programming.

- **Are there navigation problems?** Some users had problems in navigation of the site due to consistency problems. The users tried to find some pages under unrelated menus, but there was also links under unrelated menus, too. For example, when they were supposed to find information about project groups, three users searched e-sources, self-study first, while two searched homework, and the other two searched description and introduction menus. They should be looking under news or links instead. One user even could not see the item for project after clicking "links" menu. This may be due to lack of information provided at the beginning or insufficient help support, or inconsistencies due to color, placement, wording, etc.. Another problem regarding the navigation included starting chat. Three users could not find how to chat by clicking "instant messaging" icon, which was at the bottom of left frame; but selected "online user" instead. After clicking instant messaging icon, they should be maximizing the page and clicking on the "here" button to start chat. Six of the users did not notice this, and tried to write something directly after opening the page. Soon after, they realized what to do. This can be prevented by changing those requirements in order to start chat and enhance direct participation into chat environment after clicking the icon. Five of the users recommended enlarging the icons at the bottom of the left frame, since they were very small to see.

- **Is the message unclear or hard to understand?** The users did not face with a problem of unclear messages except for extra wording in links. In some links, there is

extra information like "in x format" or "click here" phrases. These phrases made users spend more time to read what was written and think on, which caused unnecessary stops. This can be prevented by omitting extra information from links and enhancing links directly on the words.

- **Does the site support the user's behavior during the performance of these tasks?** The site has a structure requiring user entries at minimum level. The links at the left and the icons at the bottom of the left helped users to navigate in the page while the information appeared at the right frame. The links are opened in new windows, which provided unity for the site. However, the headings for each page did not appear separately, therefore, the users could not see where they were. This information can be enhanced with coloring or font styles.

The users have completed most of the tasks. The completion time for each user was similar for most items, but varied for some certain tasks. This can be due to their learning styles, habits, etc. as well as design problems of the site.

**Table J1.** User Test Results

| Tasks | Rate of User Achievement | *Average Time(sec) |
|---|---|---|
| Please find information about how much "attendance and participation" affects your grade on the site. | 7/7 | 28.5 |
| Open the PowerPoint slide presentation of your 5th week lecture. | 7/7 | 5.3 |
| Find the required reading document about "Screen Design Guidelines". | 5/7 | 12.3 |
| In the lecture, the instructor stated that she would provide some materials that are possibly helpful for your project. Find and open the site for "photographs". | 7/7 | 26.25 |
| You had an assignment presentation this week. Find the evaluation criteria and deadline for reports. | 7/7 | 4.28 |
| ADDIE Model was presented in the class and the instructor told that there is additional information about this subject on the site. Find this additional information about ADDIE. | 5/7 | 8.2 |
| Find information about when and where do the lectures take place. | 4/7 | 7.25 |
| You need to contact with the course assistant Gizem Gurel, find the e-mail address of her. | 7/7 | 4.28 |
| Suppose that you are required to prepare a report about the project teams. For this, you will need to find which people are in which group. Find the 8th group's information. | 3/7 | 35.6 |

| | | |
|---|---|---|
| Please write your comments (i.e. it was interesting) to the discussion topic "MoNE Project: Skoool | 6/7 | 62,5 |
| Communicate with the people who are using the site now (write "hello" to them). | 6/7 | 22.3 |
| Change your password. | 6/7 | 5.8 |
| Find the final exam date | 7/7 | 11.8 |

*The duration of time for the users that could not complete the task is not included.

After user tests (Table J1), three experts evaluated the web site according to Nielsen's Heuristics. These expert reviews revealed similarities for the Web site usability in the light of ten heuristics of Nielsen. The experts pointed out some problems and proposed suggestions to those problems regarding visibility, consistency, error prevention, recognition, minimalist design, and help concepts.

For the visibility of the system status, they mentioned about the identification problems of mismatch of titles and related links. They were different for some links. Problems regarding the consistency included the inconsistencies in colors, words, graphics, and placements. All of the experts pointed out same problems regarding these inconsistencies. Colors differed in menu links, titles and background. There was inconsistencies in link titles, their font styles, and wording for certain operations (i.e for closing the window, three different format was being used: logout, close, it's enough). For the error prevention, one expert stated that there was a problem in changing password, which could be solved by removing ID submission demand for changes. Another expert identified the problem for chatting, which is related to Tab key. When Tab key is pressed after writing any message, messaging was ending. The other expert stated that since the site did not require user entry much, it enhanced errors at minimum level.

Nielsen stated that user's memory load should be minimized via several strategies. When the experts reviewed the site about this issue, they stated that some actions and options were not made visible for users. When a menu item was clicked on the left, information was presented in the right frame, but nothing happened the item. The title of the information was also not clear due to color problems. Another thing one expert stated was links given with "click here". Giving the link directly on the item instead of "click here" was recommended. The minimalist design in the Nielsen's Heuristics include that every unit of information should be included in relevant chunks with appropriate lengths. The experts stated that there was information not needed in some links (i.e "in … format"). In addition, there was FAQ and help buttons serving for same purposes. They suggested minimizing this information. The last problem that the experts pointed out was insufficient amount of information about help and documentation. One expert stated help was designed only about chat and password, but that it would be better to include all the relevant links and documents of the site. Other experts also recommended to enrich the data in help.

# APPENDIX L

# PILOT STUDY RESULTS

All students mentioned that the classroom was crowded. They expressed that they were sometimes getting difficulty in concentrating FTF discussions, but they could continue these discussions in forum environment comfortably. Two interviewees mentioned that the forum in online environment needed to be divided into groups as in classroom. This was a parallel argument that the instructor wrote on her notes:

> *Maybe I should divide the class into groups for the online discussions. It is getting too much for a topic when everyone takes it into different angles. I am struggling with managing all.*

One student remarked that she had some technical problems with the online environment. She could not sometimes connect to the forum environment due to password problems at the beginning of the term which was a common problem for her friends, as she stated, as well. This was resolved by instructor's help and explanations at the F2F hours. This was a lesson learnt that students needed to be informed of the features of the online environment at the very beginning of the semester.

Students also complained about the increased workload. They stated that they were struggling with managing all assignments, activities, and project work. They had only two months to develop the project, and they needed to spend a lot of time for this course. While most of the groups worked in harmony, two interviewees stated that they had trouble within their groups, but they learned how to handle it. One student (S1) said, *"I learned what not to do in a group project, as well as what to do."* Several interviewees mentioned:

> *We were asking each other: Is it really necessary to do so many for this course? It was of course good to learn, but I was very tired at the end.* (S9)

> *My problem was the workload for the semester. All instructors are behaving like their course is the only one for the semester. I had difficulty in completing all assignments.* (S10)

Another issue remarked by interviewees was inadequate guidance on project. Although the instructor provided students detailed resource on what they were supposed to do as the project, students completely understand what they were supposed to do. One interviewee suggested:

> *I and my group members, we could not exactly get what we were supposed to do as a project because this was our first time project development for such a course. It would be better if we could see examples* (S3)

The last concern that the students mentioned was the amount of online resources. They (S5 and S8) stated that they learnt a lot from example links, but they were so few. There were also several suggestions for different concerns including:

*Chat could be used for certain time.* (S4)

*Instructor should control the class better. She was listening to all!* (S5)

*I wish F2F sessions were recorded to online environment* (S7)

*I would prefer the experts gave feedback to our projects* (S9)

From the instructor perspective, the issues that need to be redesigned were related to presentation and reflection for projects, online discussion issues, team assignments and presentations, project support for real life, and online videos of F2F sessions. For the presentation and reflection of projects, the instructor wrote to her notes:

*I see that they have difficulty in processing through the stages of project development. I need to engage them into project presentations and reflection papers for each stage so that they will be more reflective.*

Another issue was online discussions. She was critical of her approach of forum environment design for two concerns: one for the crowd of students in each topic and other was content of the discussions. She felt it would be better to link the forum discussions to real life contexts. She wrote:

*I have difficulty finding topics for forum. I need to think on a strategy about linking them to authentic work life settings.*

Regarding the team assignments and presentations, the instructor believed that all workload was not shared equally within groups and it was hard to see who contributed to what part since they were not very fair in their final reports on workload to help their friends. She wrote:

*I know that one or two are doing better than the other team members, but I have no proof of this. They wrote to have same contribution in their final reports. I need to find a strategy to make sure each member of the group contributes.*

Regarding the project support for real life, the instructor became aware of the need to involve teachers in K-12 schools to help students in their project processes of problem identification and development of solutions. This was a suggestion made in a conference presentation where the instructor shared some findings of the pilot study (Temur Gedik, Kiraz, & Ozden, 2006c)

The instructor also found it a need to embed F2F recordings of the course session to online environment so that students go back and revise the content of the course where necessary. Although she uploaded ppt documents to online, she found it a better strategy to upload the video recordings online.

Finally, after the pilot study, the instructor came to a conclusion that being an instructor in blended environment needed to deal and pursue the harmony of two environments as well as dealing with their features within their own contexts. Blending FTF and online environments required thoughtful design and implementation since they pursued different student and time management, communication, and guidance features. This pushed her to determine a general pedagogical framework which would support her design between the two delivery environments.

# CURRICULUM VITAE

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## EDUCATION

| Degree | Institution | Year |
|--------|-------------|------|
| M.S. | METU, Department of Computer Education and Instructional Technology, Ankara | 2004 |
| B.S. | METU, Department of Computer Education and Instructional Technology, Ankara | 2002 |
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## PROFESSIONAL EXPERIENCE

| Period | Place | Enrollment |
|--------|-------|------------|
| 2007-2008 | Purdue University, Department of Educational Technology, West Lafayette, IN | Visiting Scholar (Fellowship from State Planning Agency for full academic year) |
| 2002-2010 | METU, Department of Computer Education and Instructional Technology | Research and Teaching Assistant |
| 2000-2002 | METU, Computer Center | Lab Assistant |

## PROJECTS

- **International Network of Students Investigating Technology for Education (INSITE)** Purdue University-METU, International partnership**, 2009-2010.

- **Peer Feedback in Online Environments (FIPSE Project)** Purdue University, 2007-2008.

- **Web-Based Training Project for National Police** METU, 2005-2006.

## AWARDS AND FELLOWSHIPS

- Finalist in 2008 PacifiCorp Design and Development Competition sponsored by Association for Educational Communications and Technology (AECT). Co-worked with Lisette Reyes, 2008.

- Scholarship from State Planning Agency to study abroad as a visiting scholar at Purdue University, 2007-2008.

## PUBLICATIONS

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