

**A STUDY ON THE ENCOUNTER OF  
THE ARCHITECT AND THE INTERIOR ARCHITECT  
THROUGH WEB-BASED COLLABORATIVE LEARNING**

A THESIS

SUBMITTED TO THE DEPARTMENT OF  
INTERIOR ARCHITECTURE AND ENVIRONMENTAL DESIGN

AND THE INSTITUTE OF FINE ARTS

OF BILKENT UNIVERSITY

IN PARTIAL FULFILMENT OF THE REQUIREMENTS

FOR THE DEGREE OF

MASTER OF FINE ARTS

**By**

**Ahmet Fatih Karakaya**

**May, 2005**

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

---

Asst. Prof. Dr. Burcu Şenyapılı (Supervisor)

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

---

Assoc. Prof. Dr. Halime Demirkan

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

---

Prof. Dr. Varol Akman

Approved by the Institute of Fine Arts.

---

Prof. Dr. Bülent Özgüç, Director of the Institute of Fine Arts.

## **ABSTRACT**

# **A STUDY ON THE ENCOUNTER OF THE ARCHITECT AND THE INTERIOR ARCHITECT THROUGH WEB-BASED COLLABORATIVE LEARNING**

**Ahmet Fatih Karakaya**

M.F.A. in Interior Architecture and Environmental Design

Supervisor: Asst. Prof. Dr. Burcu Şenyapılı

May, 2005

This study focuses how two academic disciplines; architecture and interior architecture, have collaborated on a common project. It discusses educational issues and comments on possible improvement to interdisciplinary work offering design education curriculum recommendations. With the help of rapid developments in information and communication technologies, collaboration between geographically distributed, multidisciplinary teams is becoming standard practice in the Architecture, Engineering and Construction (AEC) industry. However, in design education students seldom have a chance to collaborate with other disciplines. By integrating information and communication technologies into design studio, encounter of different disciplines can be achieved and this expected to be effective in design curriculum. In this research, students from both disciplines collaboratively designed a Turkish Store in the Netherlands in a virtual design studio environment. Information on encounter of disciplines was obtained via questionnaires and interviews. The results indicate that the similarities of disciplines and the differences in social and cultural contexts provided a rich setting for exploring cross-cultural design collaboration and understanding of interdisciplinary spatial processes in terms of design students. Overlapping boundaries of architecture and interior architecture were perceived by design students and it was an effective experiment for their professional life.

**Keywords:** web-based collaborative learning, interdisciplinary collaboration, virtual design studio, design communication, design critiques.

## ÖZET

### MİMAR VE İÇMİMARIN İNTERNET YOLUYLA KARŞILAŞMASI ÜZERİNE BİR ÇALIŞMA

**Ahmet Fatih Karakaya**

İç Mimarlık ve Çevre Tasarımı Bölümü, Yüksek Lisans

Danışman: Yrd. Doç. Dr. Burcu Şenyapılı

Mayıs, 2005

Bu çalışma iki akademik disiplinin; mimarlık ve içmimarlığın, nasıl ortak bir projede işbirliği yaptığını ele almaktadır. Bu çalışmada disiplinler arası işbirliğinin tasarım eğitimi üzerindeki etkileri ve tasarım eğitime katkıları tartışılmakta ve tasarım eğitimi ders programına yönelik tavsiyeler yapılmaktadır. İletişim teknolojilerindeki hızlı gelişimin de yardımıyla farklı coğrafyadaki disiplinler arası işbirliği Mimarlık, Mühendislik ve İnşaat (MMİ) endüstrisinde bir zorunluluk halini almaya başlamıştır. Fakat, tasarım eğitimleri sırasında öğrenciler çok nadiren diğer disiplinler ile işbirliği imkanı bulmaktadır. Tasarım stüdyosuna bu iletişim teknolojilerinin uygulanması ile disiplinlerin karşılaşması mümkün olabilir ve tasarım eğitimi ders programı için de verimli sonuçları olması beklenir. Bu araştırmada, farklı disiplinlerden öğrenciler Hollanda’da bir Türk dükkanını sanal bir tasarım stüdyosu ortamında işbirliği içinde tasarladılar. Disiplinlerin karşılaşması hakkındaki bilgiler anketler ve yüz yüze görüşmeler sonucunda elde edildi. Sonuçlar gösterdi ki, öğrenciler açısından bu çalışma disiplinlerin benzerliği ve kültürel ve sosyal bağlamdaki farklılıklar nedeniyle kültürler arası işbirliği ve disiplinler arası mekansal tasarımı için zengin bir ortam yarattı. Mimarlık ve içmimarlığın iç içe geçen sınırları öğrenciler tarafından anlaşıldı ve profesyonel hayatları için verimli bir deneyim oldu.

**Anahtar kelimeler:** İnternet tabanlı işbirliğine dayalı eğitim, disiplinler arası işbirliği, sanal tasarım stüdyosu, tasarım iletişimi, tasarım kritikleri.

## ACKNOWLEDGEMENTS

I would like to thank my supervisor, Assit. Prof. Dr. Burcu Şenyapılı not only for her invaluable supervision and guidance but also her understanding and encouragement throughout this study. It has been a pleasure to be her student and to work with her. For my future academic studies, I gained immense knowledge from her.

I owe special thanks to Asst. Prof. Dr. Bige Tunçer for her hospitality, support, suggestions and help in preparing the implementation part of the study. I am thankful to the faculty members at TUDelft who welcomed me into their classrooms and studios as a researcher and participated enthusiastically in the collaborative project. Also, this work could not be accomplished without the technical support of TUDelft.

I also express appreciation to Prof. Dr. Mustafa Pultar and Assoc. Prof. Dr. Halime Demirkan for their guidance and suggestions throughout my graduate studies.

I am grateful to my roommate, Güliz Muğan for her help, moral support, friendship and patience. In addition, I would like to thank architecture students from TUDelft, and interior architecture students from Bilkent University for their patience.

Besides, I am grateful to my parents Aycan Karakaya and Mustafa Karakaya, and my sister Ayşe Karakaya, for their invaluable support, trust, and encouragement throughout the preparation of this thesis. Nothing would be possible or meaningful without the complimentary love and encouragement of my family. I dedicate this work to my family with my deepest gratitude, in the hope that they may be as proud of me as I am of them.

## TABLE OF CONTENTS

|   |     |
|---|-----|
| SIGNATURE PAGE.....                                       | ii  |
| ABSTRACT.....   | iii |
| ÖZET.....   | iv  |
| ACKNOWLEDGEMENTS.....                                     | v   |
| TABLE OF CONTENTS.....                                    | vi  |
| LIST OF FIGURES.....                                      | xi  |
| 1. INTRODUCTION.....                                      | 1   |
| 1.1. Aim of the study.....                                | 4   |
| 1.1.1. The Context.....                                   | 4   |
| 1.1.2. The Problem.....                                   | 5   |
| 1.1.3. The Argument.....                                  | 5   |
| 1.2. Structure of the Thesis.....                         | 6   |
| 1.2.1. Methodology.....                                   | 7   |
| 1.2.1.1. Pilot Study.....                                 | 8   |
| 1.2.1.2. Collaborative Study.....                         | 8   |
| 2. PROBLEMATIC OF ENCOUNTER OF DISCIPLINES.....           | 10  |
| 2.1. Practice of Architecture.....                        | 10  |
| 2.1.1. Definition.....                                    | 10  |
| 2.1.2. Definition of an Architect.....                    | 11  |
| 2.1.3. Architectural Education.....                       | 11  |
| 2.2. Practice of Interior Architecture.....               | 11  |
| 2.2.1. Definition.....                                    | 12  |
| 2.2.2. Definition of an Interior Architect /Designer..... | 12  |
| 2.2.3. Interior Architectural Education.....              | 13  |

|  |    |
|--|----|
| 3. WEB-BASED COLLABORATIVE LEARNING.....                                 | 15 |
| 3.1. The Definition and History of Web-Based Collaborative Learning..... | 15 |
| 3.1.1. The Definition.....   | 15 |
| 3.1.2. The History.....  | 17 |
| 3.2. The Potential of Web-Based Collaborative Learning.....              | 18 |
| 3.3. Major Factors Affecting Web-Based Collaborative Learning.....       | 21 |
| 3.3.1. Communication .....   | 21 |
| 3.3.2. Task Information Enhancement .....                                | 22 |
| 3.3.3. Team Member Information.....                                      | 22 |
| 3.3.4. Collaboration Awareness .....                                     | 23 |
| 3.3.5. Agent System Design.....  | 23 |
| 4. IMPACT OF WEB-BASED COLLABORATIVE LEARNING ON EDUCATION               |    |
| OF DIFFERENT DISCIPLINES.....  | 24 |
| 4.1. The Design Studio.....  | 24 |
| 4.1.1. Origins of the Design Studio.....                                 | 25 |
| 4.1.2. Strengths and Weaknesses of the Design Studio.....                | 26 |
| 4.1.2.1. Strengths of the Design Studio.....                             | 26 |
| 4.1.2.2. Weaknesses of the Design Studio.....                            | 27 |
| 4.2. Web-Based Collaborative Learning in Design Studio.....              | 28 |
| 4.2.1. Telecommunication in Web-Based Design Studio.....                 | 29 |
| 4.2.1.1. Synchronous communication.....                                  | 30 |
| 4.2.1.2. Asynchronous communication.....                                 | 30 |
| 4.2.2. Example Studies.....  | 31 |
| 4.2.2.1. TUDelft-METU Case Study.....                                    | 31 |
| 4.2.2.2. United States- Japan Case Study.....                            | 32 |

|   |    |
|---|----|
| 4.2.3. WBCL in Relation to Weaknesses and Strengths of<br>the Design Studio.....                      | 33 |
| 5. CASE STUDY: ENCOUNTER OF DISCIPLINES THROUGH WBCL.....   | 34 |
| 5.1. Pilot Study: Students' Satisfaction with Web-Based Critiques.....                                | 34 |
| 5.1.1. The Study.....   | 34 |
| 5.1.2. Findings and Their Contribution to the Main Study.....   | 35 |
| 5.2. Research Problem and Research Questions.....   | 38 |
| 5.3. The Case Study: Encounter of Disciplines.....  | 39 |
| 5.3.1. Structure of the Case Study.....   | 40 |
| 5.3.1.1. Teams.....   | 40 |
| 5.3.1.2. Project.....   | 41 |
| 5.3.1.3. Process.....   | 41 |
| 5.3.1.4. Internet Tools.....  | 43 |
| 5.3.1.4.1. InfoBase.....  | 43 |
| 5.3.1.4.2. Weblog.....  | 46 |
| 5.4. Questionnaire.....   | 48 |
| 6. DISCUSSION AND RESULTS.....  | 50 |
| 6.1. Findings.....  | 50 |
| 6.1.1. Demographic Characteristics and Computer/Internet Background<br>of the Student Group.....      | 50 |
| 6.1.2. Findings Related to the Evaluation of Working with Another<br>Discipline.....                  | 52 |
| 6.1.3. Findings Related to the Overall Evaluation of Collaboration.....                               | 54 |
| 6.1.4. Evaluation of Strongest and Weakest Aspects of Collaboration with<br>the Other Discipline..... | 62 |



|  |     |
|--|-----|
| 6.1.5. Students' Comments on the Problems in the Collaboration with<br>Another Discipline..... | 62  |
| 6.2. Evaluations.....  | 63  |
| 6.2.1. Encounter of Disciplines.....   | 64  |
| 6.2.2. InfoBase.....   | 66  |
| 6.2.3. Encounter of Cultures.....  | 68  |
| 7. CONCLUSION.....   | 70  |
| 8. BIBLIOGRAPHY.....   | 75  |
| APPENDIX A.....  | 81  |
| A.1. Pilot Study Questionnaire.....  | 81  |
| A.2. Background Questionnaires.....  | 84  |
| A.2.1. TUDelft Questionnaire.....  | 84  |
| A.2.2. Bilkent Questionnaire.....  | 86  |
| A.3. Final Questionnaires.....   | 88  |
| A.3.1. TUDelft Questionnaire.....  | 88  |
| A.3.2. Bilkent Questionnaire.....  | 92  |
| APPENDIX B.....  | 96  |
| B.1. IAED 316 Computer Applications Fall 2003-2004 Project Brief.....                          | 96  |
| B.2. IAED 316 Computer Applications Fall 2004-2005 Project Brief.....                          | 97  |
| APPENDIX C.....  | 98  |
| C.1. Examples of InfoBase Communication.....   | 98  |
| C.2. Examples of Weblog Communication.....   | 102 |
| APPENDIX D.....  | 106 |
| D.1. Photos from TUDelft.....  | 106 |
| D.2. Photos from Bilkent.....  | 109 |

## LIST OF FIGURES

|  |    |
|--|----|
| Figure 3.1 Alternative approaches to collaborative work.....                             | 16 |
| Figure 5.1 Evaluation of face-to-face critiques.....                                     | 36 |
| Figure 5.2 Evaluation of e-mail critiques.....   | 37 |
| Figure 5.3 Comparative evaluation of both critique types .....                           | 38 |
| Figure 5.4 Formulation of collaborating teams.....                                       | 40 |
| Figure 5.5 Browse user interface of InfoBase, powered by Java.....                       | 44 |
| Figure 5.6 Reacting to a project.....  | 45 |
| Figure 5.7 Uploading comments into InfoBase.....   | 46 |
| Figure 5.8 Posting user interface of Weblog.....   | 47 |
| Figure 5.9 Creating a post for Weblog.....   | 48 |
| Figure 6.1 Evaluation of self-confidence in computer use.....                            | 52 |
| Figure 6.2 Evaluation of working with other discipline (i.a. and a. combined).....       | 54 |
| Figure 6.3 Evaluation of collaboration with other discipline (i.a. vs. a.).....          | 55 |
| Figure 6.4 Collaboration was difficult-easy (int. arch. students).....                   | 56 |
| Figure 6.5 Collaboration was difficult-easy (arch. students).....                        | 57 |
| Figure 6.6 Communication was limiting-free (int. arch. students).....                    | 57 |
| Figure 6.7 Communication was limiting-free (arch. students).....                         | 58 |
| Figure 6.8 Design submissions were informative- uninformative (int. arch. students)..... | 58 |
| Figure 6.9 Design submissions were informative- uninformative (arch. students).....      | 59 |
| Figure 6.10 Design submissions were clear- confusing (int. arch. students).....          | 60 |
| Figure 6.11 Design submissions were clear- confusing (arch. students).....               | 60 |
| Figure 6.12 Collaboration was boring-fun (int. arch. students).....                      | 61 |
| Figure 6.13 Collaboration was boring-fun (arch. students).....                           | 61 |
| Figure 6.14 Problems for both disciplines.....   | 63 |

|   |    |
|---|----|
| Figure 6.15 User interface of InfoBase..... | 66 |
|---|----|

## **1. INTRODUCTION**

In today's design world, collaboration between geographically distributed, multidisciplinary teams is becoming standard practice. However, education in 'architecture, engineering and construction' (AEC) have been slow to adjust to this rapid shift in project organization. AEC students work individually on their projects, which do not build teamwork or communication skills between disciplines (Soibelman et al., 2003).

The rise of concurrent engineering in construction demands early team formation and constant communication throughout the project life cycle. However, AEC education seldom supports these needs, focusing on individual projects with few opportunities instead of building teamwork and communication skills. Similarly, while most students are exposed to information technologies that are focused on supporting individual disciplines, AEC curricula have not yet focused on introduction of collaborative information tools (Soibelman et al., 2003).

Not only to reach information but also to share, to exchange information is very easy with the help of information and communication technologies (ICT), and some special world wide web based software. As Ragoonaden and Bordeleau (2000) state these new information and communication technologies have caused some changes in educational system. According to this situation, universities have changed their course syllabi in order to integrate information and communication technologies.

Computer Aided Design (CAD) courses and use of Internet are noticeable examples of this new integration of information and communication technologies into design

education curriculum. From design education point of view, advantages in image processing, three dimensional modeling, simulation, multimedia tools and computer networking provide a variety of possibilities for the design instructors and students. Quick and simple accesses to information, data formulation and communication for exchange of information are examples of these possibilities. Internet and CAD software have the potential to change design studio process. In traditional design studios, design students get face-to-face critiques individually or as a group. Since design students can get their studio critiques on a CAD program via Internet, they can develop their projects collaboratively.

Craig and Zimring (2000) state the use of computers to facilitate collaboration in design education is becoming increasingly practical because networked computing becomes cheaper, faster, and more graphical. Computer systems can be used to help students each other but argues that, to be effective, they must take into account both the nature of design and the nature of interpersonal communication, preferably in a connected fashion. An understanding of design is assumed to be important in setting communication goals, while an understanding of communication accepted as important in getting students to construct and interpret exchanges such that those communication goals are actually met (Craig & Zimring, 2000).

Today, it is possible for universities to be supported by virtual design studios-networked facilities that provide the geographically distributed participants in a design project with access to the organizations' databases and computational resources, efficient messaging and data exchange, and sophisticated videoconferencing.

Unfortunately, effective integration of these technologies into the work practices of design professionals has been problematic. While AEC project organizations increasingly use information technologies to facilitate practice, beyond isolated examples there is little evidence to suggest that this capability has significantly shortened facility design times or dramatically increased the number or quality of design alternatives (Soibelman et al., 2003).

The design studio is one of the major components of both architectural and interior architectural education. Traditionally, in both architectural and interior architectural education, the design studio has been considered a physical space for individual design work and face-to-face mentoring between an instructor and a student. Nowadays, due to the integration of new information and telecommunication technologies (ICT), Computer Aided Design, and World Wide Web, the nature of the design studio and the learning processes are being changed. This new type of the design studio offers many opportunities for globally distributed collaborative design education. The new virtual collaborative design studios can involve multidisciplinary design participants from separate and distant physical and social environments that are electronically connected for sharing design ideas, creating a common understanding of design practices, and co-constructing design artifacts. The technologies and the studio system are need to be understood if these technology-mediated long-distance collaborative design studios are to be common, valuable, and creative in both architectural and interior architectural education.

## **1.1. Aim of the Study**

This thesis argues that effective web-based collaborative learning (WBCL) in design education is possible; it can bring valuable educational and practical outcomes, and can be achieved when different disciplines are brought together at an early stage in their education process. The case study shows how two academic disciplines; architecture and interior architecture, have collaborated on a common project; it discusses educational issues, and comments on possible improvement to interdisciplinary work offering design education curriculum recommendations.

In the meanwhile, this thesis points out the problems that occur in the encounter of architecture and interior architecture in professional life. This thesis assumes that the ‘role playing’ in their education may reduce and/or help in resolving these problems.

### **1.1.1. The Context**

With the help of rapid developments in information and communication technologies, collaboration between geographically distributed, multidisciplinary teams is becoming standard practice in the AEC industry (Soibelman et al., 2003). Design students can easily work on collaborative design projects with access to the course’s database, use of CAD programmes, efficient communication and data exchange. Within this context, two disciplines; architecture and interior architecture, are set up to collaborate via collaborative design studio (CDS) on a joint project.



### **1.1.2. The Problem**

Interior architects have to collaborate with other professionals such as architects, civil engineers, and mechanical engineers in practice. However, throughout education they seldom have a chance to collaborate with other disciplines. Students in these fields work on their projects individually. Their university education does not encourage teamwork or improve communication skills with other disciplines. When these students are confronted with the collaborative reality of today's professional practice, they may feel inadequate.

On the other hand, at the end of such an education, during which they work mostly individually, architects may often feel that they may be responsible for all design works. The ambiguity in the borders of the definitions of both disciplines and the overlapping of the tasks aid in the formation of problems related to task and responsibility distribution.

### **1.1.3. The Argument**

Interior architects and other disciplines especially architects should be confronted in their educational life to be prepared for the future encounter in the professional life. As such, they may learn, discuss, to get familiar with each profession's terminology, ways of doing, and approaches. By integrating information and communication technologies into design studio, encounter of different disciplines can be achieved and this could be effective in design curriculum. With this use of technology, changes may occur in the design studio's participants and relationships. Encounter of design

students helps recognition of domains. Hence, they are able to make almost a rehearsal of the professional life.

This thesis argues that the changes in the design studio can create an enriched environment for design learning for both architecture and interior architecture. Also, these students are prepared for competitive and collaborative reality of today's professional AEC practice.

## **1.2. Structure of the Thesis**

This thesis investigates the use of web-based collaborative learning process among different professionals namely, interior architect and architect. It is composed of two parts; explaining the theoretical frame of the thesis and implementation of web-based collaborative learning through a case study. The first part consists of Chapter 2, 3, and 4. Problematic of encounter of disciplines is explained in Chapter 2. This chapter defines the two disciplines, their education, requirements, and their working boundaries. In Chapter 3, web-based collaborative learning is proposed for the encounter of disciplines in their education. The definition, history, potential and major factors affecting web-based collaboration are the contents of this chapter. The last chapter in the first part analyses impact of web-based collaborative learning on education of architecture and interior architecture. As a key factor, design studio is proposed for implementation of encounter, and the communication in web-based collaborative design studio is analyzed.

The second part involves the pilot study, case study, discussion and results, and conclusion. The fifth chapter starts with the pilot study, which is an attempt to students' contentment with WBCL and indicate possible problems. After the pilot study, implementation of the case study takes place. The case study involves the architecture and interior architecture students in a common project. The teams, project, process, and internet tools help to explain the case study. Explanation of applied final questionnaire is the last part of Chapter 5. In discussion and results chapter, findings of the study are depicted in graphics and tables, and the case study is evaluated in terms of encounter of disciplines, InfoBase, and encounter of cultures. The final chapter concludes the purpose, the collaborative study, results and discussion for further studies and gives comments for design education curriculum.

### **1.2.1. Methodology**

This research was a study on a web-based collaborative experience involving both architecture and interior architecture students. The contentment and evaluation of the students for both the pilot study and the case study were analyzed through a set of questionnaires. The observations of the students and the instructors were studied through individual interviews.

Within this framework, I situated myself both as an interior architect, an instructor, and a researcher. My background in interior architectural education (same as the interior architecture students involved in the studies) and my position as the assistant of the course, within which the studies were held, helped me a lot both for practical reasons and in deeper observations.

#### **1.2.1.1. Pilot Study**

A pilot study was held in order to understand and evaluate students' opinion and approach to web-based critiques while developing a design project. The positive outcomes of such a study would indicate that students did not regard the use of web-based tools in the course of design as a negative factor. They would also indicate that any negative evaluation later in the main case study would not directly and solely be loaded upon students' rejection and/or discontent of interference of web-based techniques. The pilot study involved two sets of consecutive design critiques during the course of a design project (Appendix B.1).

IAED 316 Computer Applications course students were selected for this study because of their aptness to computer. My main role in the pilot study was giving two critiques before the final presentation. The first critique was face-to-face mentoring. For this critique, design students came to the studio with architectural drawings, axonometric drawings, rendered perspectives and some material samples. We discussed design objectives and their project in terms of requirements.

For the second critique, design students attached their drawings; computer generated perspectives and 3D models to an e-mail and sent to my e-mail account. Then comments and criticisms were given by e-mail. After the study completed, a questionnaire was applied, interviews were done.

#### **1.2.1.2. Collaborative Study**

For this study, two elective courses and their students were selected. I personally spent one month in the Netherlands, to decide on course objectives, to meet with instructors

and architecture students, and to give information about Bilkent University and its interior architecture students. Also I participated in the first three classes with the TUDelft students.

Before the case study, a background questionnaire was applied to figure out architecture and interior architecture students' computer and Internet experiences at the beginning of the study (See Appendix A.2).

After the preparation process, students of both disciplines started to design 'a Turkish Store in the Netherlands' collaboratively. Groups were composed of 2 interior architecture students and 3 architecture students. There were 8 groups. InfoBase of TUDelft was utilized for collaboration. InfoBase was used to exchange, manage and store information that students collect and generate. Collaboration between two universities took about 9 weeks and after that Bilkent students took over the project and developed until final presentation.

## **2. PROBLEMATIC OF ENCOUNTER OF DISCIPLINES**

This chapter discusses encounter of two academic disciplines: architecture and interior architecture. In professional life, architects do not seem to recognize the field of interior architecture. Also, interior architects do not seem to feel the necessity to fit in the boundaries drawn by the architects. This may largely be due to the overlappings of architectural fields, in areas like space planning, space programming, space layout, selection of materials, furnishings and components. These overlappings may become so evident that in some cases the responsibilities of an architect and an interior architect may conflict with each other, creating a battle for professional duties. This chapter discusses the boundaries of these two disciplines with the help of definitions and their education systems.

### **2.1. Practice of Architecture**

#### **2.1.1. Definition**

According to International Union of Architects (UIA), “the practice of architecture consists of the provision of professional services in connection with town planning and the design, construction, enlargement, conservation, restoration, or alteration of a building or group of buildings. These professional services include, but are not limited to, planning and land-use planning, urban design, provision of preliminary studies, designs, models, drawings, specifications and technical documentation, coordination of technical documentation prepared by others (consulting engineers, urban planners, landscape architects and other specialist consultants) as appropriate and without limitation, construction economics, contract administration, monitoring of construction (referred to as “supervision” in some countries), and project management” (UIA,

1998). Architecture was seemed to be an umbrella; covering other architecture related disciplines such as interior architecture, landscape architecture, urban design and so on. This creates the condition of overlapping of the boundaries between these disciplines.

### **2.1.2. Definition of an Architect**

UIA defines architect as “reserved by law or custom to a person who is professionally and academically qualified and generally registered/licensed/certified to practice architecture in the jurisdiction in which he or she practices and is responsible for advocating the fair and sustainable development, welfare, and the cultural expression of society’s habitat in terms of space, forms, and historical context” (UIA, 1998).

### **2.1.3. Architectural Education**

According to UIA, architectural education should ensure that all graduates have knowledge and ability in architectural design. These should include technical systems and requirements as well as consideration of health, safety, and ecological balance; that they understand the cultural, intellectual, historical, social, economic, and environmental context for architecture; and that they comprehend thoroughly the architects' roles and responsibilities in society, which depend on a cultivated, analytical and creative mind (UIA, 1998).

## **2.2. Practice of Interior Architecture**

Interior architecture and interior design are used sometimes interchangeably and sometimes separately in the literature.

### **2.2.1. Definition**

The interior design profession provides services encompassing research, development, and implementation of plans and designs of interior environments to improve the quality of life, increase productivity, and protect the health, safety, and welfare of the public. The interior design process follows a systematic and coordinated methodology. Research, analysis, and integration of information into the creative process result in an appropriate interior environment.

### **2.2.2. Definition of an Interior Architect /Designer**

(adopted by the IFI General Assembly, May 25, 1983)

International Federation of Interior Architects/Designers defines interior architect as  
“The professional interior architect/interior designer is a person, qualified by education, experience and recognized skills, who:



- identifies, researches and creatively solves problems pertaining to the function and quality of the interior environment; and
- performs services relative to interior spaces including programming, design analysis, space planning, aesthetics and inspection of work on site, using specialized knowledge of interior construction, building systems and components, building regulations, equipment, materials and furnishings; and
- prepares drawings and documents relative to the design of interior space,

in order to enhance the quality of life and protect the health, safety and welfare of the public” (IFI).

### **2.2.3. Interior Architectural Education**

According to IFI, the interior architectural education would normally be minimum four years duration, and interior architectural curriculum should include at least the following main headings:

1. Fundamentals of design (philosophy, sociology, aesthetics and a theory of design).
2. Visual research (color, light, form, texture).
3. Basic knowledge of materials (wood, metal, plastic, fabric, etc.).
4. Visual communication (objective and interpretative drawing, freehand perspective drawing, use of color media, photography and model making).
5. People in their environment (human ergonomic and anthropometric studies and people in space and design evaluation, history of art and architecture, interiors and furniture).
6. Creative work by the project method (information and briefing, design analysis, design exploration, design solutions submitted in a visual form).

7. Interpretation of the project schemes and technical studies related to the built environment (working drawings, building technology, understanding of structure and services. Costing and estimating detailing and specifying materials, furniture and fittings).
8. Professional practice (verbal communication techniques, office organization and practice, legislation affecting the designer, visiting projects in the course of being made or built).

Romice and Uzzell (2005) indicate the importance of interdisciplinary design education as “design education, practice and research address complex questions, systems and problems through a synthesis across disciplines. Even more so does education for the design of the built environment, in its aim to match human needs and aspirations to the scale and spatial quality of the built environment”.

Romice and Uzzell (2005) state several disciplines can enhance collaboration – not only design-based disciplines, such as architecture, planning, landscape, interior and urban design, but also disciplines centered on social studies, such as sociology, psychology and geography. However, design based disciplines can achieve more because of their similar backgrounds.

### 3. WEB-BASED COLLABORATIVE LEARNING

#### 3.1. The Definition and History of Web-Based Collaborative Learning

In this chapter the definition and history of web-based collaborative learning is defined by the help of literature.

##### 3.1.1. The Definition

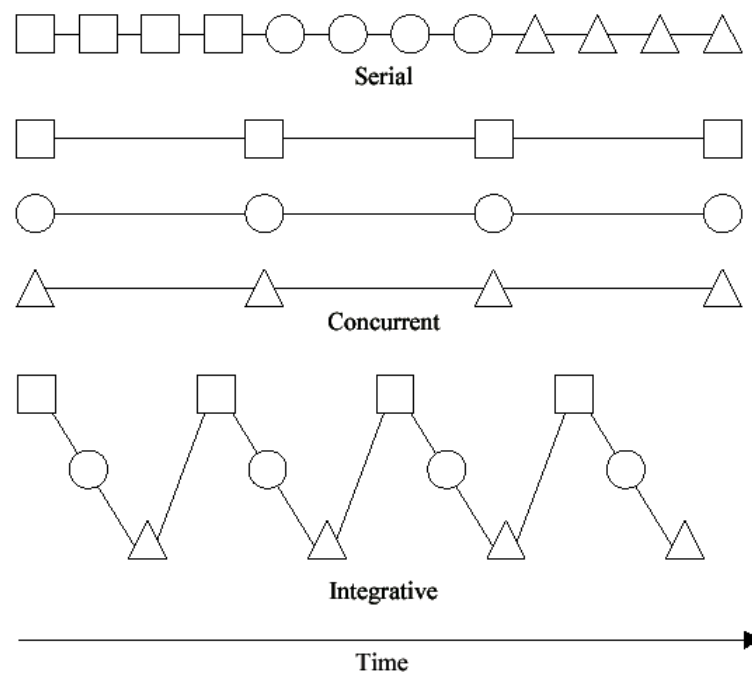
**collaborate** (*intransitive verb*): to work jointly with others or together especially in an intellectual endeavor (Merriam-Webster dictionary).

Panitz (2005) defines collaboration as a philosophy of interaction and personal lifestyle. In collaboration, individuals are responsible for their actions, including learning and respect the abilities and contributions of their peers. Group member shares authority and accepts responsibility for the group actions. The main concept of collaborative learning is consensus through cooperation by group members, in contrast to competition.

Achten (2002) defines collaborative design as “collaborative design looks at how the process can be improved in such a way that collaboration –working together in a manner to enhance each participant’s contribution to the design– emerges from the process” (p. 1).

Panitz (2005) states the design is an interactive process until the final artifact is designed among group members. Each group consults with the instructor and other groups throughout this process. Each group and the instructor evaluate group’s

performance. In collaborative design process, design students might go back through history to determine how other periods of peace were created. This process is open ended while it maintains a focus on the overall goal. The students develop a very strong ownership for the process and respond very positively to the fact that they are given almost complete responsibility to deal with the problem posed to them and they have significant input into their assessment (Panitz, 2005).



**Figure 3.1** Alternative approaches to collaborative work. (source: Soibelman et al., 2003)

Collaborative learning's principles can be summarized as:

- Students work together to get results in a greater understanding than working independently.
- Understanding is increased with spoken and written interactions.
- Students must be free and participate voluntarily (Panitz, 2005).

Information and telecommunication technologies provide students a wide range of possibilities to collaborate. Web-based tools create more flexible conditions for collaborative learning in terms of time and place for both students and instructors. Students can collaborate synchronously and asynchronously via web-based tools.

Students can generate design projects with the help of computer aided design (CAD) and upload in to Internet. Their collaborators and design instructors can give comments and criticize their projects synchronously or asynchronously. These opportunities of web-based tools provide conditions for virtual design studios.

### **3.1.2. The History**

In the late 1960's and early 1970's, some colleges embarked on live televised distance learning, an approach often referred to as the "candid classroom," using two-way video and one-way audio. In the early 1980's another form of video-based distance learning began to evolve: telecourses. Unlike the synchronous classes, telecourses are highly produced video documentaries or dramas that present information related to the learning objectives and are often broadcast by stations or college cable channels.

In 1990's the Internet growth with its impact felt in our lives in dozens of ways. E-mails are used for communication, in the late 1990's and early 2000's Internet-based discussion boards were emerged and all these have created conditions for web-based collaborative learning.

### **3.2. The Potential of Web-Based Collaborative Learning**

Collaborative learning has a large potential for design education. Group works make design students consider the needs, skills and unique perspective of their groups.

Collaborative learning also focuses design students to examine, to express and to re-evaluate their own projects.

As Shaffer (2001) states, design is not a process to answer simple questions but a process over time. For this reason, design teaching has to involve the evaluation and implementation to various steps and settings to help students in understanding, exploring and expressing the design brief and the solution for the design problem (Sagun, 2003). The students need motivation for conducting and developing the design ideas for the improvement of design brief. Instructors motivate students through conversations about the project, intellectual quests, drawing sketches, non-verbal clues, and introduction of a new media or design projects involving similar problems or solutions to the given design brief (Sagun, 2003).

Like Brandon (1999) stated that collaborative learning approach has dealt primarily with classroom-based environment, not web-based environment. This situation raised the question of web-based environment of how well the benefits of collaborative learning, will translate to the web-based environment.

Zhao and Akahori (2001) explain benefits of collaborative learning as “...builds self-esteem in students, enhances student satisfaction with the learning experience, promotes a positive attitude toward the subject matter, provides weaker students with extensive one-on-one tutoring, provides stronger students with the deeper

understanding that comes only from teaching material, and promotes learning goals rather than performance goals” (p.1).

Additionally, Fowler (1996) states “the web allows the ability to more efficiently share the process of education or information with greater numbers of persons. This allows for the ability to celebrate the educational process and make more of an event surrounding 'real life issues' that students should be exposed to and discuss in the academic setting” (p. 6)

WBCL promotes critical thinking skills. Students work together in the learning process instead of passively listening to the teacher present information or reading information off a computer screen. Pairs of students working together represent the most effective form of interaction, followed by larger groups. Johnson (1971) states, when students work in pairs one person is listening while the other partner is discussing the question under investigation. Both are developing valuable problem solving skills by formulating their ideas, discussing them, receiving immediate feedback and responding to questions and comments by their partner. The interaction is continuous and both students are engaged during the session. Compare this situation to the lecture class where students may or may not be involved by listening to the teacher or by taking notes. According to McCarthy and McMahon (1992) "Research focusing specifically on revision when peers respond to and edit writing has revealed that students can help one another improve their writing through response". Nystand (1986) found that “students who responded to each other's writing tended to reconceptualize revision, not as editing, but as a more substantive rethinking of text, whereas students who did not work in groups viewed the task as editing only” (p.19).

WBCL involves students actively in the learning process. The level of discussion and debate within groups and between pairs is substantially greater than when an entire class participates in an instructor led discussion. Peterson and Swing (1985) state “...students receive immediate feedback or questions about their ideas and formulate responses without having to wait for long intervals to participate in the discussion”.

Collaborative learning creates an environment of active, involved, exploratory learning. Web-based collaborative learning actively involves students in the learning process. When a group of students attempt to solve a problem or answer a question they become involved in the process of exploratory learning (Panitz, 2005). As a result of interactivity, design students share their ideas and information, discuss information, make decisions to generate their concept and finally they present their artifact to other groups and their instructors.

Collaborative learning allows students to control on task. The interactive environment of web-based collaborative learning places design students in a position of control over the design process and encourages them to take full responsibility for the outcome of particular assignments. Panitz (2005) states students receive training in social skill building, conflict resolution and team management. “The locus of control is with the student because the teacher serves as facilitator not director. Students are given a great deal of leeway to decide how they will function and what their group's product will be. CL empowers students to take control over their education” (p. 8).



### **3.3. Major Factors Affecting Web-based Collaborative Learning**

In this section, the major factors that affect the web-based collaboration are investigated. It is possible to group these factors in to communication, task information enhancement, team member information, collaboration awareness, and agent system design.

#### **3.3.1. Communication**

As Jones and Kasif (1997) stated, communication is fundamental to collaboration. Poor communication can lead to poor collaboration performance. Collaborators could be informed by means of e-mail, fax, phone, or other methods. The lack of information could lead other designers to longer product lead-time. During design collaboration, designers might receive many comments from their collaborators. Reading every incoming comment, solving the problems, and answering every question are crucial to collaboration (Xie and Salvendy, 2003).

#### **3.3.2. Task Information Enhancement**

Artefacts provide several sorts of visual information: physical objects, spatial relationships to other objects, visual symbols such as words, pictures and numbers, and their state (Gutwin and Greenberg, 2000). In asynchronous design collaboration, designers may lose artefacts cues, because they do not have a co-located workspace (Xie and Salvendy, 2003). It is difficult for designers to have a better understanding

about the collaboration project if no information is presented to them in the interface. The drawing (task) information enhancement is proposed to support collaboration task awareness.

### **3.3.3. Team Member Information**

For geographically distributed work groups, maintaining awareness of team members' activities is more difficult and requires some degree of technological intervention (Fussell et al .1998). By using WBCL, distributed design students collaborate asynchronously. If the interface of the WBCL tool does not provide enhanced information about team members, then collaboration awareness is affected (Xie and Salvendy, 2003).

### **3.3.4. Collaboration Awareness**

Team Member Information Enhancement (TMIE) and Task Information Enhancement (TIE) are important to support collaboration awareness and activity coordination. TMIE is proposed to support collaborator awareness, and TIE is proposed to support task awareness. Level of awareness of team members and project tasks will help

collaborators to coordinate their activities more effectively, which will improve collaboration efficiency (Xie and Salvendy, 2003).

### **3.3.5. Agent System Design**

Maes (1994) described an agent as a personal assistant that is collaborating with the user. Mainly there are two types of agent systems: server agent and designer agent systems. A server agent system monitors all collaboration activities and communicates with each designer agent within a group to get requests and provide services. A designer agent runs in the designer's computer system. Each designer in the collaboration group has a designer agent running in his or her workstation. Each designer agent communicates with the Server Agent dynamically and assists designers in communication, collaboration awareness, and activity coordination.

## **4. IMPACT OF WEB-BASED COLLABORATIVE LEARNING ON EDUCATION OF DIFFERENT DISCIPLINES**

### **4.1. The Design Studio**

Traditionally, both architectural and interior designs are learned through a project-based "studio" approach. In traditional studio environment, design students express themselves, generate and evaluate alternatives, and ultimately make decisions. Design students make some external representations such as orthographic drawings, axonometric drawings, perspectives, and models in this traditional studio environment. Design students learn to communicate, to critique and to respond to criticism, and to collaborate in the studio environment (Gross and Do, 1997).

Johnson (2000) explains the term studio as “the pedagogic construction known as a "studio" is used to teach the subtle, imprecise, and culturally rooted but individually artistic process of design. It describes a mixture combining place, a group of people, and a fairly standardized process, all overseen by the faculty mentor in charge” (p. 17)

Broadfoot and Bennett (2001) define design studio as “The term *Design Studio* has come to inherit two commonly used definitions. It is seen as actual physical space where designing occurs and/or the conceptual and practical process of designing: one that sometimes incorporates a method of teaching centered on the activity of learning by doing” (p. 27).

Johnson (2000) explains studio with Schön’s theory of ‘knowing in action’ as “The central idea behind studio education, as described by Schön and others, is learning by

doing. The student works at a design problem with the assistance and guidance of the studio critic or master. The mentoring process provides the conduit by which good design, while outwardly difficult to describe, is demonstrated, practiced, and adopted by the student—to become what Schön calls ‘knowing in action’” (p. 19).

Another approach to traditional studio environment belongs to Wilson and Jennings (2000) and they explain studio, as

“When an audience is asked to describe what they do in a lecture hall, they invariably suggest activities such as: listen, take notes, chat, sleep, read, and so on. When asked what they think might happen in a studio they usually suggest: paint, draw, sculpt, write, and other active pursuits. The difference is clear. The focus in a studio is on work done by the student” (p.73).

#### **4.1.1. Origins of the Design Studio**

This chapter tries to explain how the design studio entered into the architectural education system. Yee (2001) explains origins of the design studio in The Ecole des Beaux-Arts:

“The Ecole des Beaux-Arts in Paris officially taught architectural design from 1819 to 1968. The Académie was intended to elevate the architects from the construction sites and studio workshops, or *ateliers*, to a structured institutional environment. However, the customs of the medieval guilds lived on since the academicians continued to have apprentices in their *ateliers*, the places in which design was actually learned. A student attended lectures at the school, but his work was done in the *ateliers*, independent of the Académie” (p. 38).

Through the politic turmoils that followed, the atelier style of teaching persisted and finally formed the Ecole des Beaux-Arts, and from the *atelier* experience became the basis for design studio today (Yee, 2001).

#### **4.1.2. Strengths and Weakness of the Design Studio**

The activities of design belong in “the indeterminate zones of practice,” as Schön

states, in which the designer is faced with situations of “uncertainty, uniqueness and value conflict [that] escape the canons of technical rationality” (Schön, 1987, p. 6.). Design students learn how to confront complex design problems in the design studio. Yee (2001) states “the learning that occurs in the studio then is not so much about acquiring and transferring particular pieces of technical knowledge, although that also does occur, but is more about exploring and internalizing multiple ways of seeing, creating, and transforming knowledge by creative construction” (p. 41). The most important characteristic of the studio that allows this kind of learning to occur resides then in its members and the spirit they give to the studio. This spirit, inherited and refined by the *ateliers* of the Ecole des Beaux-Arts, is one of “freedom, competition, and variety.” (Carlhian, 1979, p.7). It gives the studio its greatest strengths, but when the studio does not work well, this spirit also is the basis of its weaknesses (Yee, 2001).

#### **4.1.2.1. Strengths of the Design Studio**

Yee (2001) states the greatest strength of the design studio is its members. Since the students and instructor are assembled in a common space joined by common interests and activities, they are poised to form some kind of community as they interact and work together. When the studio works well, this community provides various creative learning relationships and opportunities for the student.

The students and instructor can form a community with a sense of purpose, belonging, and shared values. The student can develop deep relationships with his instructors and

his friends as they are engaged together in their creative learning-by-doing (Yee, 2001). Students are free to develop their projects, with the guidance of their instructors and their friends through the design process.

The design studio is free to include a wide range of events, in addition to face-to-face critique and the review, needed for the particular design problem, such as guest lectures, research seminar-type discussions, off-site visits and consultations. This project-oriented structure gives opportunities for the instructors to expose students to different people, processes, and expertise (Yee, 2001).

#### **4.1.2.2. Weaknesses of the Design Studio**

If a student is in a situation where he can build good relationships with talented friends, the studio may be the best place for learning design and he can take advantage of the spirit of freedom, competition, and variety. However, the limitations of the studio space when there are few opportunities and when relationships fail (Yee, 2001).

In addition to above weaknesses of the design studio, students have to spend very long time in the design studio. Sometimes critique process may take several hours. Also being prepared to critiques may take many hours. Design students have to be present in studio environment all the studio time to listen to other students' critiques, to be criticized by instructors or other students.

## 4.2. Web-Based Collaborative Learning in Design Studio

Broadfoot and Bennett (2001) define web-based studio as “The *online design studio* refers to a networked studio, distributed across space and time. The participants are in various locations, and the design process and communication are computer mediated and computer supported. Often referred to as ‘Virtual Design Studios’ (VDS) they allow designers to be located anywhere yet still participate in collaborative work. There have been many varied formats in the relatively short history of online studios. The major differences often manifest themselves in the areas of communication and collaboration.”

In preparation for 21<sup>st</sup> century Fowler (1996) states “future design professionals must be prepared to sort through greater amounts of non-codified information critically, and look at separations in physically proximity as opportunities for collaboration. Creating a virtual design community that is accessible to the world enables students to benefit immensely in extending classroom discussion beyond the academic walls of the University”(p.7).

Gasen (1996) emphasizes importance of technology in supporting group development. “E-mail, video-conferencing and real-time audio exchange can help support group development, particularly when groups are working in distributed settings. Technology can also provide an electronic record of team activity or support other group processes such as brainstorming and consensus building, wiring and editing, document versioning etc.” (p. 4).



Fowler et al. (1996) states “Groupware has the potential to create highly efficacious learning environments that address three areas of critical concern in higher education: quality of the learning experience, access to learning opportunity, and containment of cost. In other words, groupware can yield gains within each dimension of learning productivity: quality, access, cost” (p. 8).

Three categories of issues concerned with web-based collaborative projects are central to the success of team learning with technology: group dynamics, which is of central importance to the development of group cohesion, cooperation and effective work; pedagogic issues including the changing roles of faculty to support this type of learning; and administrative issues concerned with supporting, regulating and assessing students' collaborative work (Gasen & Preece, 1996).

#### **4.2.1. Telecommunication in Web-Based Design Studio**

Fowler (1996) states interface of the web page should provide a link between the student's work and the virtual visitor. Also these web pages should be fast, fluid, friendly, and fun.

Web site should be fast (between 30 - 50 kb), broad bandwidth is important when web sites contain large graphics. If a web site is slow, people may get bored, or lose interest (Fowler, 1996).

Web site should be fluid, interface should be appropriate. The interface should provide an adequate frame for seeing the organization of the site (Fowler, 1996).

Web site should be friendly, graphically balanced. Student portraits and biographies in web sites are important. This allows students to overcome the 'empty image syndrome' (Fowler, 1996).

Web site should be funny, should provide adequate entertainment. Entertainment is an important factor in keeping the attention of students. Audio, video and animation files should be placed carefully and kb of these files should be limited, provide relief from the content (Fowler, 1996).

#### **4.2.1.1. Synchronous Communication**

Synchronous communication implies the simultaneous presence and participation of all designers in the studio collaboration and is supported by high-bandwidth technology such as video conferencing, shared electronic whiteboards and chat rooms (Broadfoot and Bennett, 2001). Most online studios rely on a mixture of both methods of communication.

#### **4.2.1.2. Asynchronous Communication**

Asynchronous communication refers to designers working at different times, possibly on different parts of the design, without the simultaneous presence of other team members. Technology that facilitates asynchronous communication includes email and FTP (file transfer protocol).

## **4.2.2. Example Studies**

### **4.2.2.1. TUDelf- METU Case Study (Akar et al.)**

In this case study, *InfoBase* of TUDelf was implemented an international interdisciplinary course. In this study Dutch and Turkish students participated from their home countries. The course was elective in both universities. 11 industrial design students from METU (Turkey) and 5 architecture students from TUDelft (the Netherlands) came together to design design a game. The game was designed for children and played with two or three balls. The course took 9 weeks to complete the game.

After the final product, a questionnaire was applied. Questions about usability of InfoBase, group work in a virtual environment, international collaboration and language and cultural differences were asked in questionnaire. According to findings:

- Students were pleased for being part of an international group.
- They agreed that international group work increased their motivation and added value for their professional life.
- Students faced some problems but they felt confident of overcoming any problems they had with InfoBase.
- Students agreed with that their groups achieved good results.

### **4.2.2.2. United States- Japan Case Study (Agerup- Büsser)**

This case study evaluated distributed cross-cultural teams with a web-based intervention called *BrainSpace* which allows sharing explicit knowledge, and ensures

that all participants gain tacit knowledge within a collaborative process. In a graduate-level course, students from US and Japan worked in a team to create a product requested by an industrial sponsor. In this study, instead of a mutual engagement that led to knowledge creation, only the lower level of a web-based coordination was reached.

Some recommendations to improve computer supported collaborative learning in cross-cultural teams have been made:

- In cross-cultural communication, information and communication technologies (ICT) play an important role in supporting learning and teaching.
- Since universities often focus on models that support individual learning, there is a need to adapt by adopting more collaborative learning instruction in the classroom.
- Based on the student's awareness of cultural differences, they would be able to better analyze and judge their own ongoing collaboration with others.
- An institutional structure should make clear the common vision of the participating universities.
- Collaboration process within a distributed team, it is important to integrate the heterogeneous groups with alternative world views and different perspectives and to make known each other and build trust and commitment.
- It is also important to structure and pace the process related to the time restriction, and to provide a shared space by mediating appropriate tools for collaboration.

#### **4.2.3. WBCL in Relation to Weaknesses and Strengths of the Design Studio**

Web-based collaborative learning can easily compensate for the afore mentioned weaknesses of the design studio. In WBCL students feel freer to attend to the discussions because they are virtually represented. Preparing design submissions are easier and faster. In asynchronous settings, there are no time limitations to upload or download design submissions. Also students can communicate all students in virtual design studio, whenever they want, easily access to their friends projects and their critiques. Students have an opportunity to search previous week's critiques.

In addition to existing advantages of traditional design studio, web-based design studio offers unlimited events because of the Internet. Video conferences can be held to compensate for the absence of physical being.

## **5. CASE STUDY: ENCOUNTER OF DISCIPLINES THROUGH WBCL**

In this thesis, the consequences of integrating telecommunication technologies into the architectural and interior architectural design studios are examined through two cases. First case examines the satisfaction with face-to-face and e-mail critiques in a design project, and the second case examines the use of WBCL in the encounter of design students from different disciplines.

These case studies indicate that both architecture and interior architecture students are active participants in constructing their new technology-mediated learning environment through creative experimentation. Findings of these cases provide a comprehensive description of the technical and social characteristics, conditions, and practices of web-based collaborative design studios. In these new virtual design studios, there are rich opportunities for building innovative and effective communities for design education in which the traditional boundaries of time, culture, language, discipline, and institution are blurred and new configurations for design learning become possible.

### **5.1. Pilot Study: Students' Satisfaction with Web-Based Critiques**

#### **5.1.1. The Study**

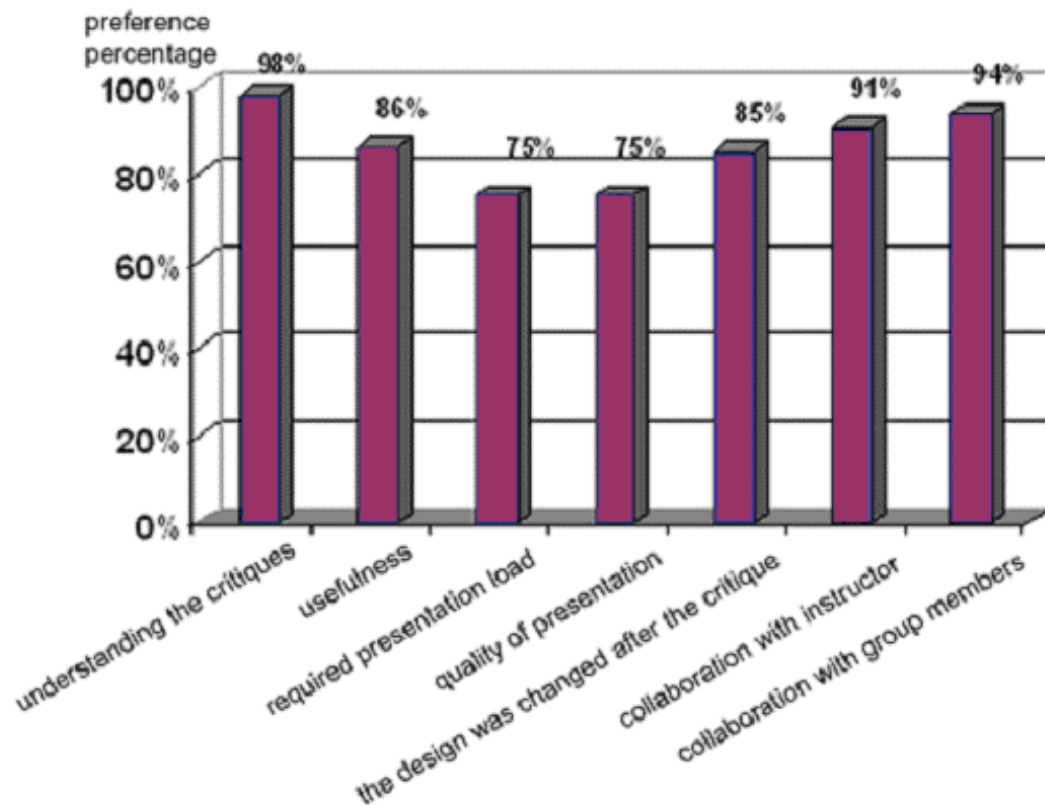
This study discusses the impact of using Internet and e-mails in design critiques in comparison to conventional face-to-face communication process in the design studio. This pilot study was held to understand the level of readiness design students to web-

based collaborative learning. The participants of this study were 4th and 3rd year design students with previous experience in computer aided design. The students had to develop a design project through face-to-face and Internet-based critiques. Students formed groups of 3-4 to work on the project. Total duration of the project was 6 weeks. Students had a 3-hours course each week. At the end of the critique sessions students were asked to evaluate both techniques comparatively (Şenyapılı and Karakaya, 2005).

### **5.1.2. Findings and Their Contribution to the Main Study**

A set of 5 point scale was used to obtain an overall evaluation of both types of communication, in terms of *easiness, flexibility, quickness, stimulation capacity, and clearness* (See Appendix A). Students seemed to be more satisfied with the quality of presentations they needed to prepare for the e-mail critique than the quality of the ones prepared for face-to-face communication (Şenyapılı and Karakaya, 2005).

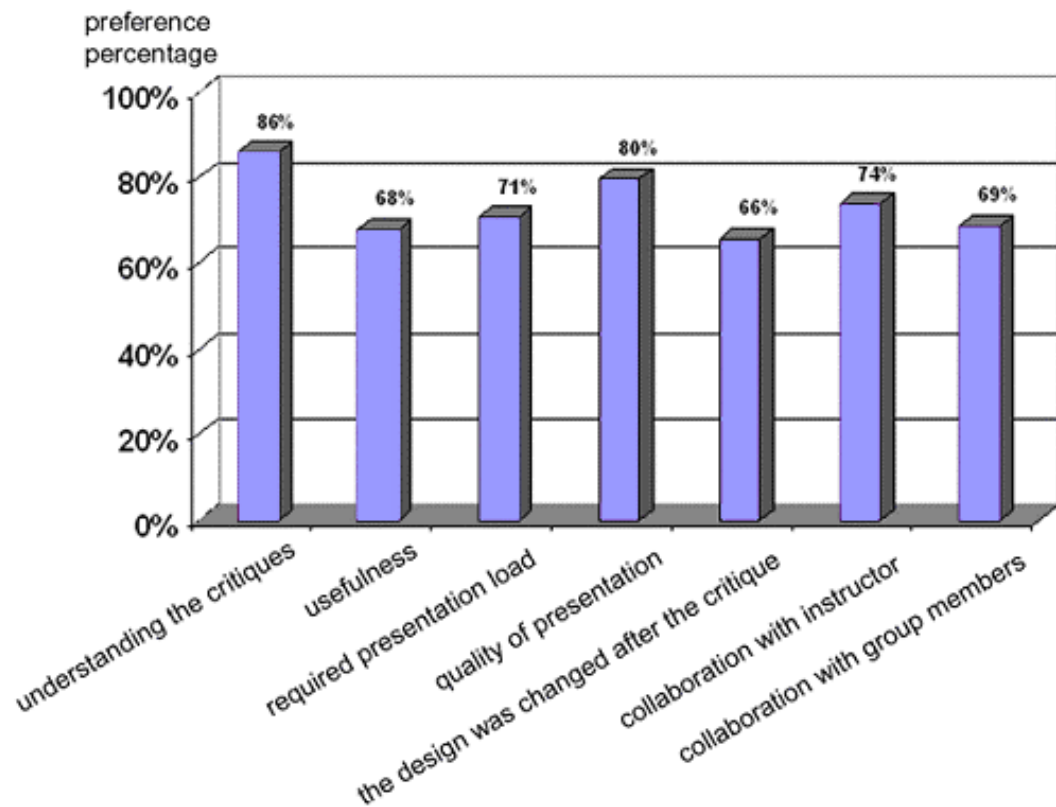
Face-to-face communication received the highest mean (mean= 4.76) in the evaluation for *understanding the critiques*. This result indicates that understanding the critiques via face-to-face communication was evaluated as being *easy*. The lowest means were obtained equally (mean= 3.76) for *preparation load of presentation* and *quality of presentation*. Students stated that for face-to-face critiques, the preparation of the presentations was *difficult* and they were *not satisfied* with the quality of the presentations (Figure 5.1) (Şenyapılı and Karakaya, 2005).



**Figure 5.1** Evaluation of face-to-face critiques (source: Şenyapılı and Karakaya, 2005).

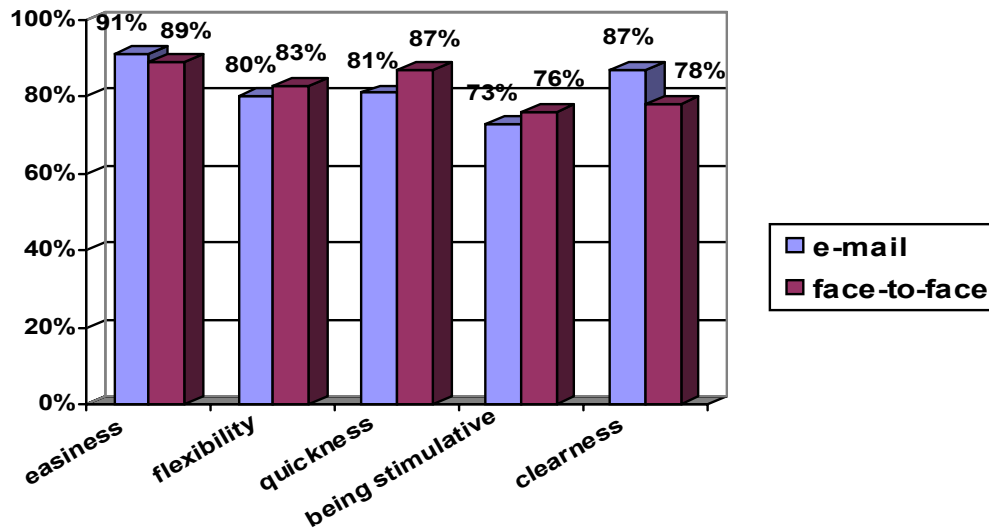
E-mail communication received the highest mean (mean= 4.30) for *understanding the critiques*, the result indicating that understanding the critiques via this mode was similarly evaluated as being *easy* as in face-to-face. The least mean (mean= 3.30) for e-mail communication was held for *the design was changed after the critique* (Figure 5.2) (Şenyapılı and Karakaya, 2005).





**Figure 5.2** Evaluation of e-mail critiques (source: Şenyapılı and Karakaya, 2005).

As seen in Figure 5.3, the comparative evaluation of both critique types, students did not point out a major dissatisfaction with the e-mail critiques compared to the conventional face-to-face style.



**Figure 5.3** Comparative evaluation of both critique types (source: Şenyapılı and Karakaya, 2005)

This finding led to the initiation of the main case study without being concerned much about students' rejection of the WBCL for technical reasons or biases.

## 5.2. Research Problem and Research Questions

Beforehand studies were mostly related to improvement of tools and systematic methodology of design courses. This case study aims to encounter two different academic disciplines through web-based collaborative learning. As Sagun (2003) states “collaborative design studio development necessitates the understanding of possibilities and constraints in both design collaboration and the media being used” (p.64), students have to cope with adaptation problems, communication problems, technical problems and time based problems while using Internet tools and working with another discipline through web based collaborative learning.

In the lighting of concepts mentioned above, two research questions are formulated:

1. Does web-based collaborative learning contribute to the education of different disciplines?
2. Does working with architecture students contribute to the education of interior architecture students? (and vice-versa)

### **5.3. The Case Study: Encounter of Disciplines**

This study focuses on the collaboration between architecture and interior architecture. However, the collaboration between architecture and interior architecture is still very limited in their education.

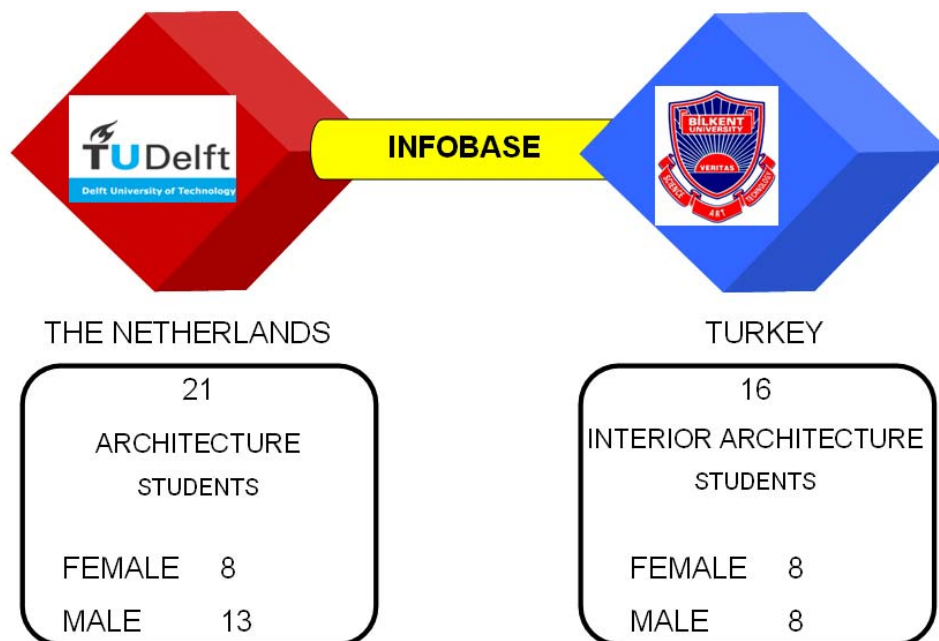
This case study argues that effective interdisciplinary collaboration in design education is possible. This interdisciplinary collaboration can bring valuable educational and practical outcomes. And also this can be achieved when the two disciplines are brought together at an early stage in their design education process.

The case study shows how two academic disciplines; architecture and interior architecture, have collaborated on a common project; it discusses educational and organizational issues, and comments on possible improvement to interdisciplinary work offering educational recommendations.

### 5.3.1. Structure of the Case Study

#### 5.3.1.1. Teams

The ‘Turkish Stores in the Netherlands’ was a case study of collaboration between two elective design courses, one in department of architecture and the other in department of interior architecture. From Delft University of Technology (TUDelft) (Delft, the Netherlands) BK 6810 Audio Visual Production course 21 architecture students, and from Bilkent University (Ankara, Turkey) IAED 316 Computer Application course 16 interior architecture students were participated in this case study (Figure 5.4).



**Figure 5.4** Formulation of collaborating teams

In the collaboration, architecture students were responsible for client profile, built environment, facade and other architectural decisions and interior architecture students were responsible for interior decoration, lighting, acoustics, furniture design, and circulation pattern. They were communicating electronically between Delft and Ankara.

#### **5.3.1.2. Project**

This collaboration aimed to generate a creative dialogue between architecture and interior architecture students for the designing of a Turkish Store in an inner city area in the Netherlands. The envelope of the building uploaded internet site of TUDelft. Students downloaded this envelope in .dxf (drawing interchange format) and used in AutoCAD and 3DS Max computer programmes. Turkish Store may sell any product. The concept of the store was generated collaboratively.

#### **5.3.1.3. Process**

This interdisciplinary collaboration between two universities took nine weeks to complete. The collaborative process generated educational, social and professional capital and challenges for both groups. Long-distance collaboration was realized through a virtual-studio (InfoBase) with limited direct contacts and the cultural diversity of the two disciplines with different curricula, philosophy, teaching styles and learning outcomes.

In the first phase architecture students decided a place for store and took two short video films. The first video project included two short videos: one with still images in a sequence and the other one with moving images.

The first video project that uploaded into InfoBase:

- demonstrated Turkish stores in the Netherlands, gave an idea about Turks in the Netherlands, (Still images with sound)
- described program brief and client profile, demonstrated the built environment. (Moving images with sound)

After the first video, Bilkent students selected one project and joined this group. Group worked together to develop a concept and a program for the store. Bilkent students reacted to videos with architectural drawings, posters, flash animations and 3D images.

The second video project was composed of moving images; also using sound enriched videos. This video project:

- developed an architectural view,
- gave clues about materials, lighting, atmosphere,
- gave clues about form and boundaries of space,
- gave clues about structure,
- supported the concept.

Interior architecture students responded to the second video projects with sketches, architectural drawings, 3D images, and perspectives. After 9 weeks, Bilkent students took over the project and develop it further.

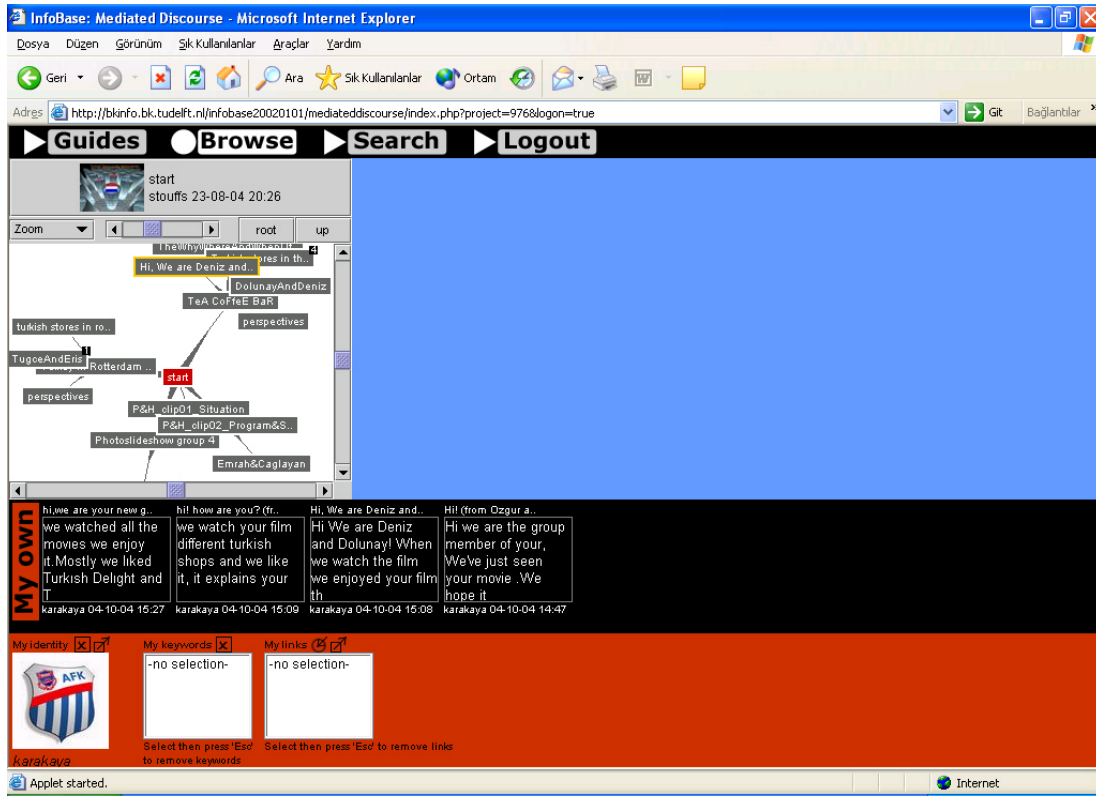
#### **5.3.4. Internet Tools**

In order to handle the collaboration, InfoBase was utilized. Both group of students used the InfoBase to exchange, manage and store information that student groups collect and generate. For synchronous communication, students used a mailing list, a web log and Microsoft MSN Messenger.

##### **5.3.4.1. InfoBase**

(<http://bkinfo.bk.tudelft.nl/infobase20020101/mediateddiscourse/index.php?project=976>)

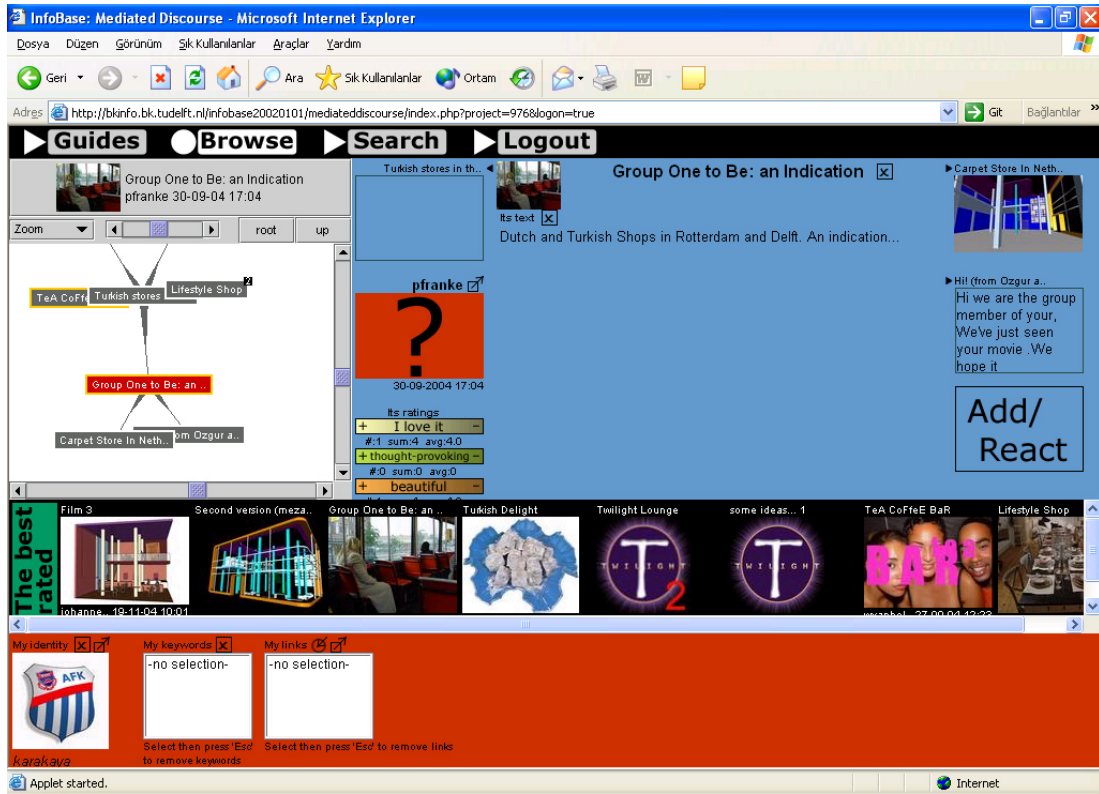
InfoBase is a collaborative virtual design-learning environment being developed at Delft University of Technology (Akar, et al. 2003). InfoBase contains students' ideas and design artifacts in the form of 2D and 3D computer drawings, sketches, photos, movies, images, texts, and sounds etc. Using InfoBase's shared database, students meet and share their thoughts, ideas, and critiques. Students are able to see other students' work and their criticisms in addition to their work and their criticisms by using Java powered browse user interface (Figure 5.5).



**Figure 5.5** Browse user interface of InfoBase, powered by Java.

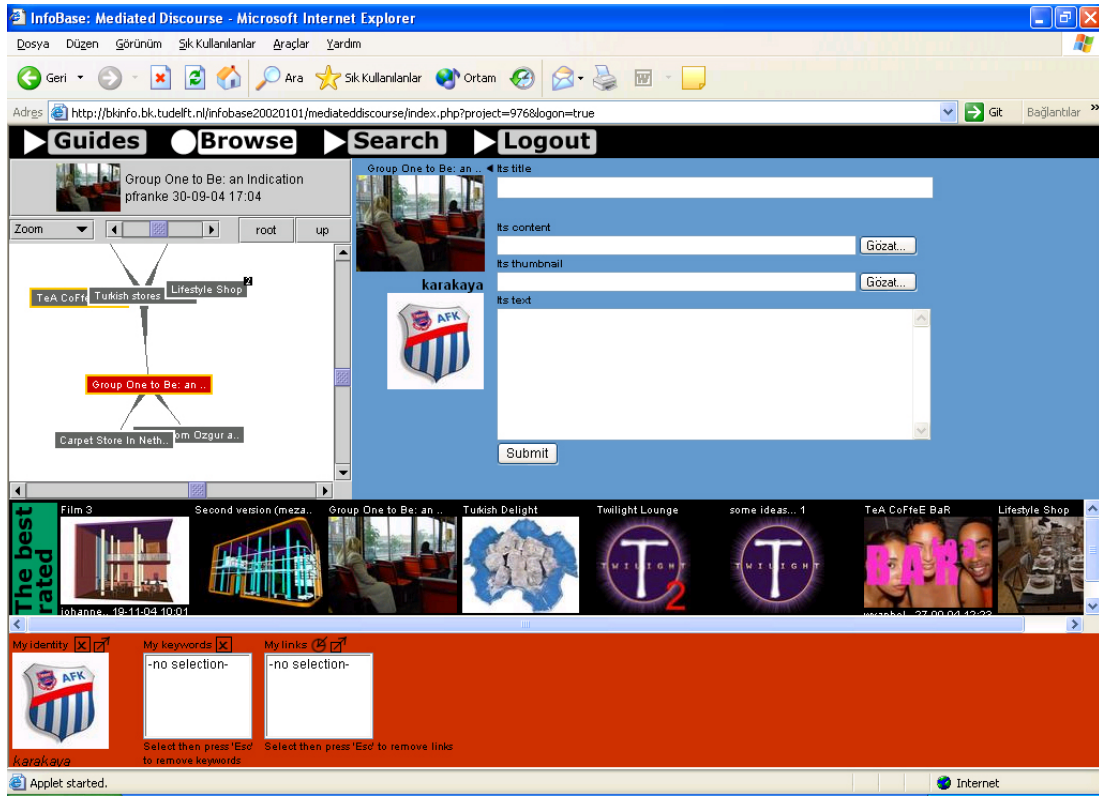
InfoBase let users to upload or download large files with a range of different formats. Website supports .jpeg, .tiff, .bmp, .tga for photo file formats, .avi, .mpeg, .wma, .dvi for video files and .mp3, .wav, .asf for sound files. Also users can upload any file in their computer as attachment to their contributions (Figure 5.6).





**Figure 5.6** Reacting to a project

When students want to react to a project, they simply click Add/React button in the browse user interface (Figure 5.6). After clicking the button, reaction form appears (Figure 5.7). In this form, students fill their reaction's title, it's content by browsing their computer, it's thumbnail (photos for quick view), and it's text.



**Figure 5.7** Uploading comments into InfoBase

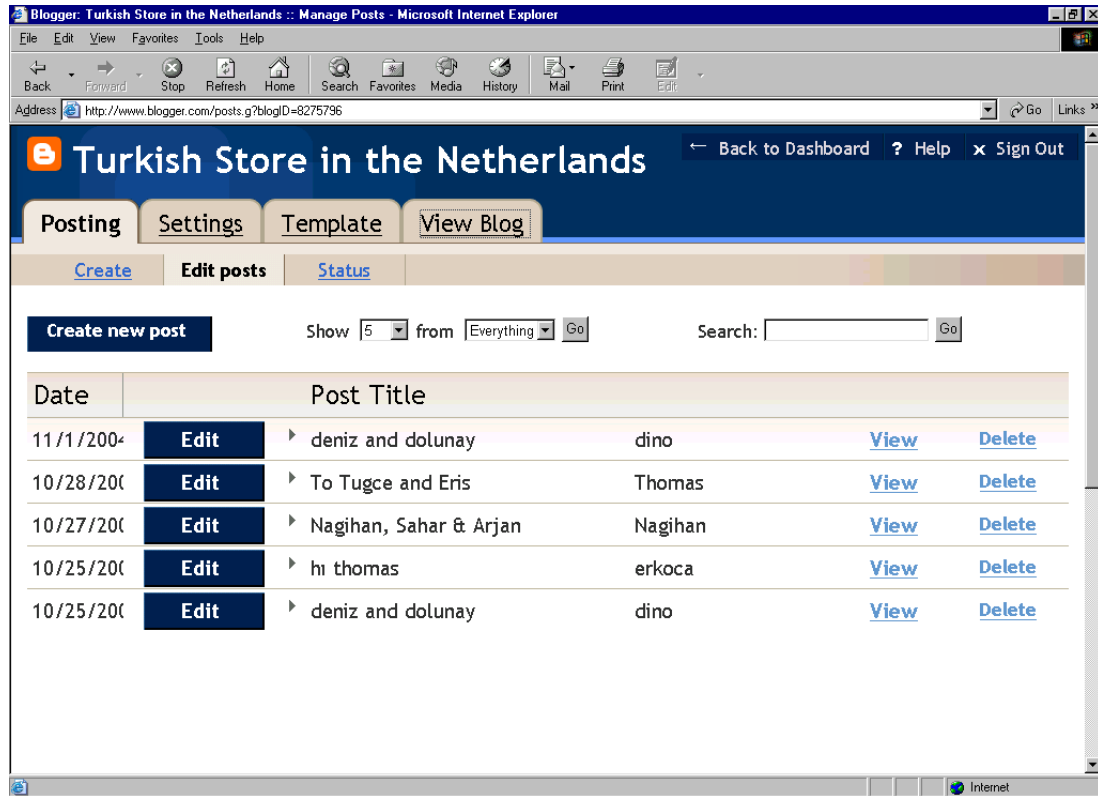
#### 5.3.4.2. Weblog

(<http://www.turkishstores.blogspot.com>)

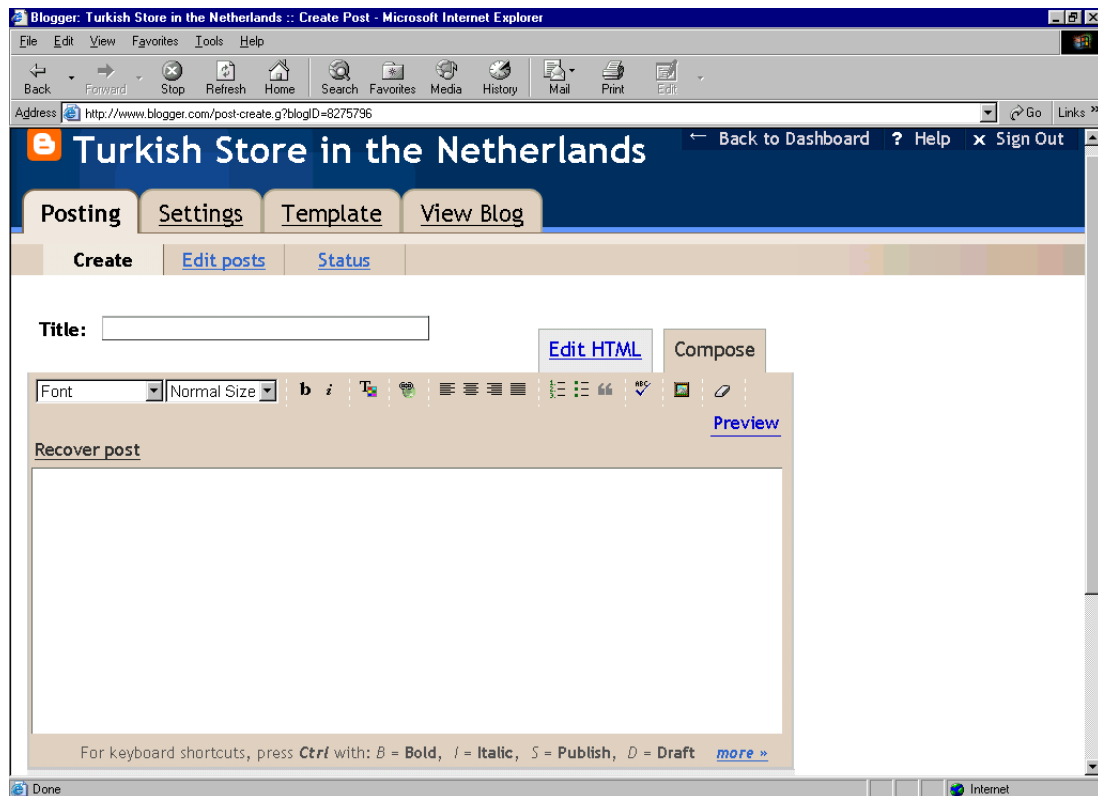
A blog is an easy-to-use web site, where users can quickly post thoughts, interact with people, and discuss. A blog can be named as a personal diary, a daily pulpit, a collaborative space, or a collection of links. In the internet, there are millions of them, in all shapes and sizes, and there are no rules for creating a blog.

In simple terms, a blog is a web site, where users write stuff on an ongoing basis. New additions are shown at the top, so visitors can read what's new. Then they either comment on or link to it, or send e-mail to the owner of the blog, or to the users of the blog.

To create a new post, students click ‘create new post’ button in the posting page of the blog (Figure 5.8). In the ‘create’ page, students give a title to their posting and write their post by using edit HTML (hyper text mark-up language) window (Figure 5.9).



**Figure 5.8** Posting user interface of Weblog.



**Figure 5.9** Creating a post for Weblog

## 5.4. Questionnaire

After the completion of the project, all students were asked to fill a questionnaire. This questionnaire was composed of several parts (See Appendix A.3):

- In the first part demographic characteristics were asked (Findings 6.1.1),
- The second part tried to find out students' computer and Internet background (Findings 6.1.1),
- The third part involves specific questions about working with other discipline (Findings 6.1.2),
- After that, students were asked to evaluate overall collaboration with other discipline (Findings 6.1.3),

- Strongest points and weakest points of collaboration with other discipline were asked (Findings 6.1.4),
- Finally, students pointed out some problems in collaboration with other discipline (Findings 6.1.5).

## 6. DISCUSSION AND RESULTS

### 6.1. Findings

#### 6.1.1. Demographic Characteristics and Computer/Internet Background of the Student Group

Through a background questionnaire (See Appendix A.2) the demographic information and students' background in using computers were obtained. Student groups both in TUDelft and in Bilkent were involved in separate sessions to fill in the questionnaires. The demographic information indicated that the overall mean age was 22.51 for the group that consisted of 21 male and 16 female students.

All participating students had previous computer experience, the least one being 4 years and the maximum one being 17 years. The mean for computer experience for both interior architecture students and architecture students was 9.3 years. They have previously used the computer for writing, drawing, and/or connecting to the Internet. Again, all students had previous Internet experience, the least one being 3 years and the maximum 11 years. Regarding the Internet use, the mean for interior architecture students was 5.8 years and for architecture students it was 6.8 years.

Both student groups were generally *feeling confident* while using computer and Internet tools. Both disciplines *feel confident while using World Wide Web*; the mean for computer experience was 6.3 years.

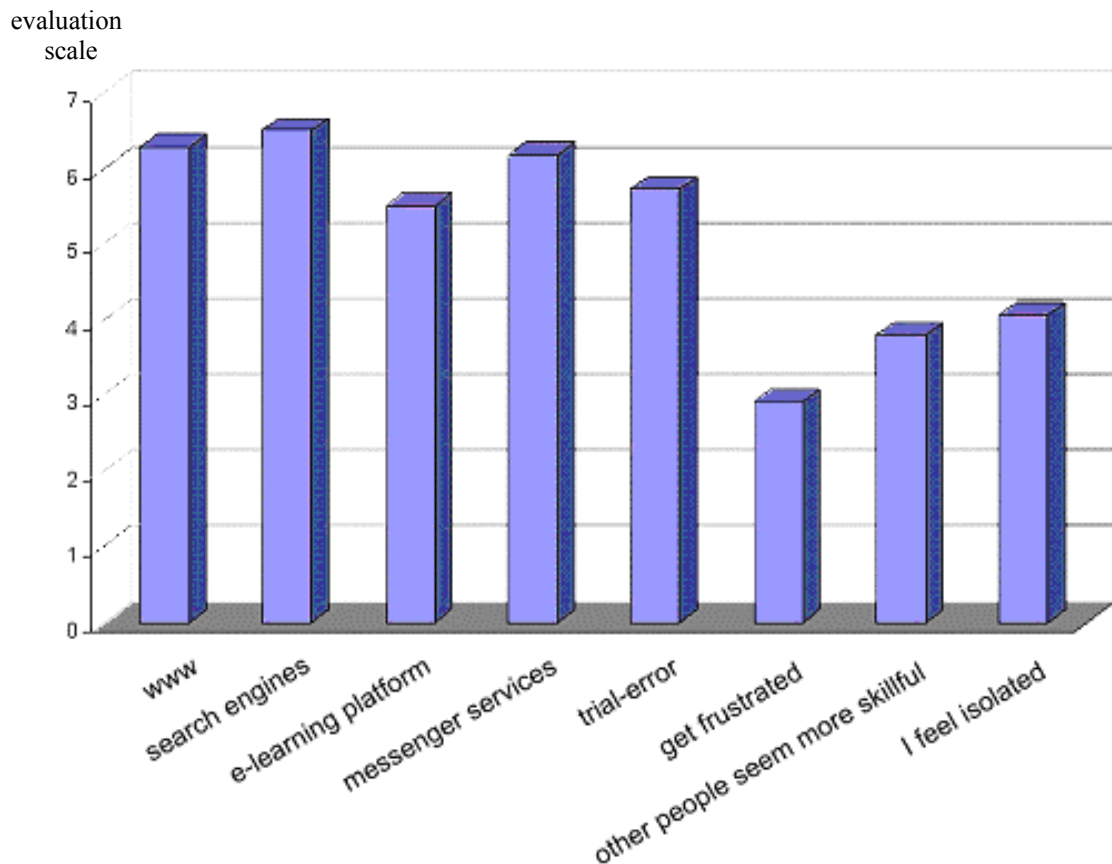
Architecture students feel more *confident* than interior architecture students while using search engines; the mean for interior architecture students was 6.5 and for architecture students was 6.6.

Interior architecture students feel more *confident* (mean for interior students,  $m_{ia}= 5.6$ ) than architecture students (mean for architecture students,  $m_a= 5.4$ ) while using an e-learning platform. Messenger services make both disciplines feel *confident*. The mean for interior architecture students was 6.3 and for architecture students was 6.1.

Interior architecture students *learn more with trial and error* method. The mean for interior architecture students was 6.1 and for architecture students was 5.3.

Students of both disciplines *do not get frustrated* while using computers. The mean for interior architecture students was 2.8 and for architecture students was 3.1.

When students asked *whether other people seem more skilful* when using computers, the mean for interior architecture students was 3.7 and for architecture students was 3.9. Only one interior architecture student stated to feel completely *isolated* from other people while using computer. Two of architecture students never feel *isolated* from other computer users. The mean for interior architecture students was 4.5 and for architecture students 3.5 (Figure 6.1).



**Figure 6.1** Evaluation of self-confidence in computer use.

### **6.1.2. Findings Related to the Evaluation of Working with Another Discipline (question no 1)**

Through a final questionnaire (See Appendix A.3) student groups were asked to evaluate the issues related to the collaborative work and collaboration. Out of the 21 participating students from TUDelft, 12 returned filled questionnaire forms, whereas out of the 16 Bilkent students, only one student did not return the questionnaire form. Question number 1 was composed of a table where students would evaluate comments about working with another discipline on a 1 to 6, 1 being *strongly disagree* and 6 being *strongly agree*.



Working with other discipline made interior architecture students *learn more* ( $m_{ia}=3.9$ ) and architecture students also *learned more* working with interior architecture students ( $m_a=3$ ).

Both disciplines were *excited* working with other disciplines. Mean for interior architecture students was 4.9 and for architecture students was 3.9.

Interior architecture students indicated working with architecture *students led to a more successful design* ( $m_{ia}=4.4$ ) however architecture students were uncertain ( $m_a=2.8$ ).

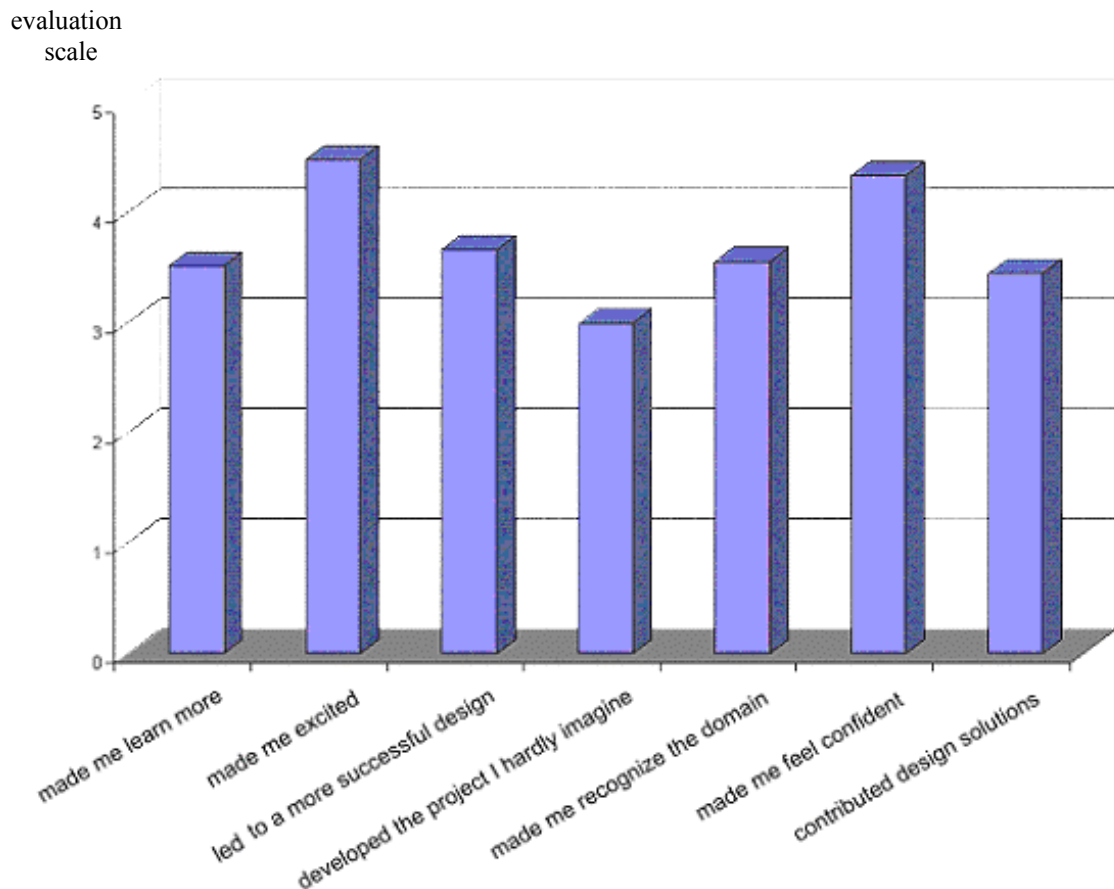
Interior architecture students agree that working with architecture students *developed their projects in a manner that otherwise they would hardly imagine* ( $m_{ia}=3.5$ ). Again architecture students were uncertain about development of their projects ( $m_a=2.4$ ).

Working with architecture students made interior architecture students *recognize the domain of architecture* ( $m_{ia}=4.3$ ). Hence, architecture students indicated that interior architecture is a part of their domain ( $m_a=2.7$ ).

Interior architecture students *felt more confident* as an interior architect while working with architecture students ( $m_{ia}=4.7$ ). Architecture students also had this kind of confidence while working with interior architecture students ( $m_a=3.8$ ).

Interior architecture students agree that working with architects *contributed formulation of design solutions* ( $m_{ia}=4.1$ ). Yet, architecture students were uncertain

about contribution of interior architects to the formulation of design solutions ( $m_a = 2.7$ ) (Figure 6.2).



**Figure 6.2** Evaluation of working with other discipline (i.a. and a. combined)

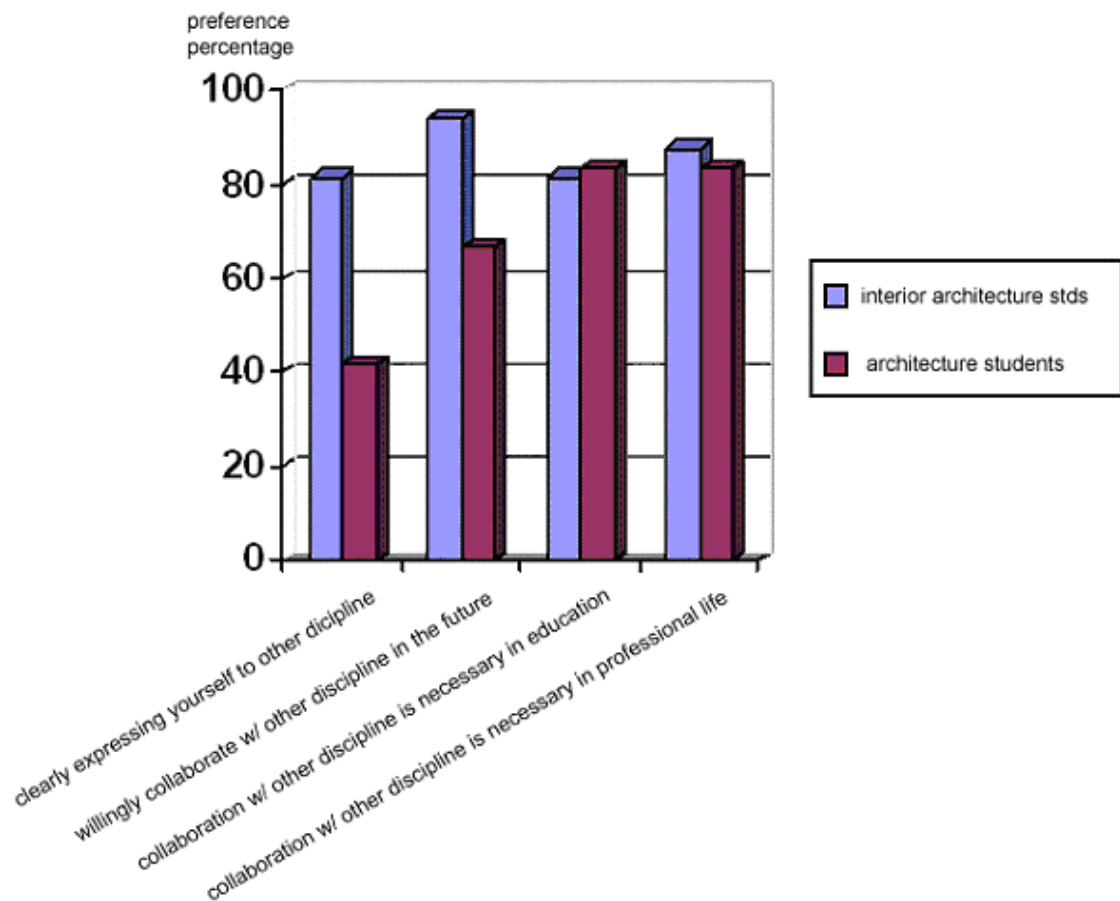
### 6.1.3. Findings Related to the Overall Evaluation of Collaboration (questions 2 to 5 and 15)

A set of yes-no questions with open-ended extensions were asked to determine students' overall evaluation of the idea of collaboration with another discipline.

Interior architecture students seem to have easily collaborated with the other discipline.

They felt that they were *clearly expressing themselves* to architecture students. On the

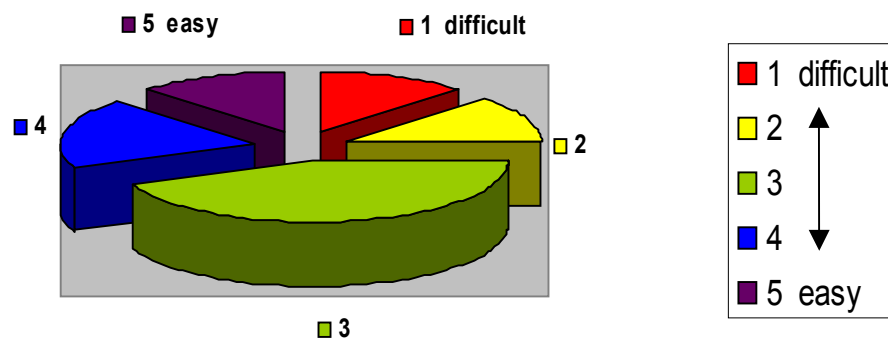
other hand, architecture students indicated they felt that they *did not clearly express themselves* to interior architecture students. Although interior architecture students were more ready to collaborate with other discipline, architecture students also expressed that they would *willingly collaborate with other discipline in the future*. Both disciplines agreed that *collaboration with other discipline is necessary in their education*. Also they indicated *collaboration with other discipline is necessary in their professional life* (Figure 6.3).



**Figure 6.3** Evaluation of collaboration with other discipline (i.a. vs. a.)

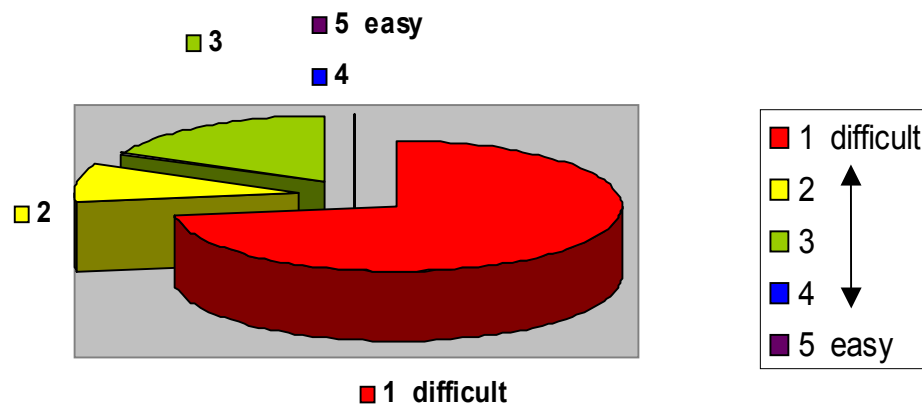
Students were then asked to evaluate collaboration with another discipline in terms of *easiness*, *flexibility*, *quickness* and *provision of information*, each item to be graded a 5 to 1 scale.

Interior architecture students were rated *easiness* of collaboration mostly 3. The percentages were the same for *difficult* and *easy* (Figure 6.4).



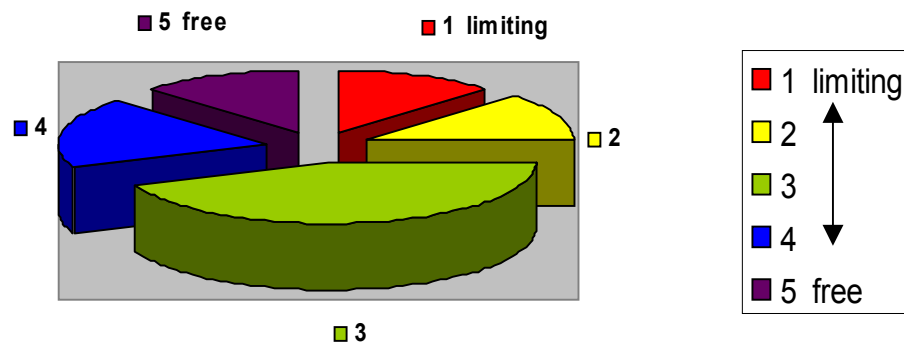
**Figure 6.4** Collaboration was difficult-easy (int. arch. students)

According to architecture students collaboration with interior architecture students was *difficult*. None of the architecture student rated collaboration 4 or 5 in the preference scale. Majority of them rated collaboration with interior architecture students as *difficult* (Figure 6.5).



**Figure 6.5** Collaboration was difficult-easy (arch. students)

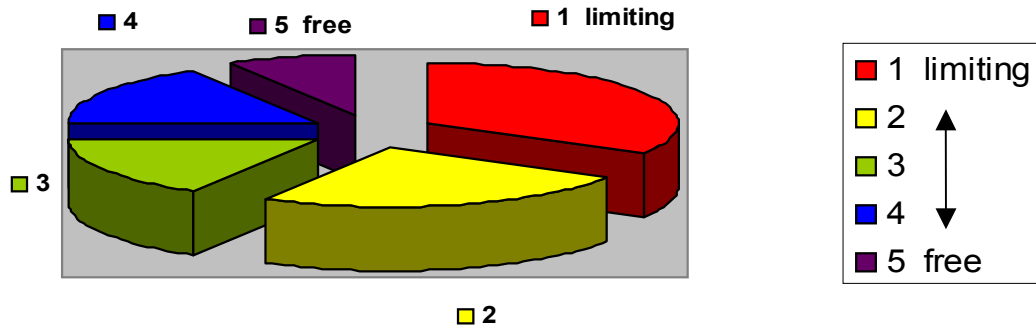
Interior architecture students found communication neither completely *limiting* nor completely *free*. Majority of them rated 3. Again percentages for communication being completely *limiting* and completely *free* were the same (figure 6.6).



**Figure 6.6** Communication was limiting-free (int. arch. students)

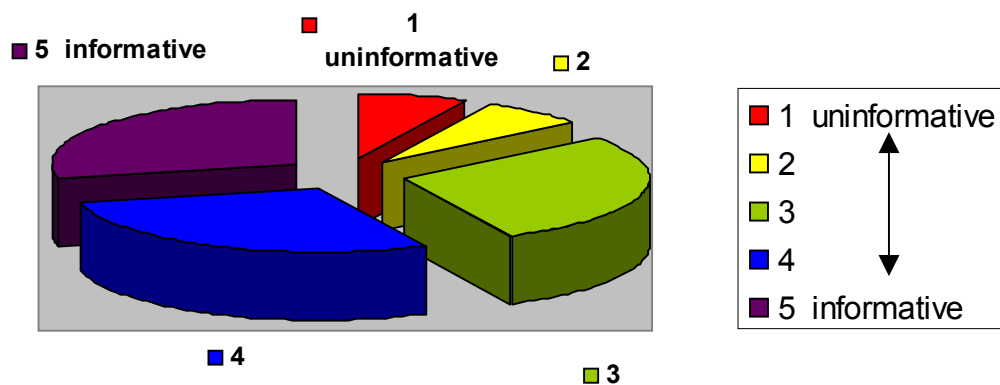
Architecture students' tendency in the evaluation of communication was towards *limiting*.

Majority of them rated 1 and 2 indicating limited communication (figure 6.7).



**Figure 6.7** Communication was limiting-free (arch. students)

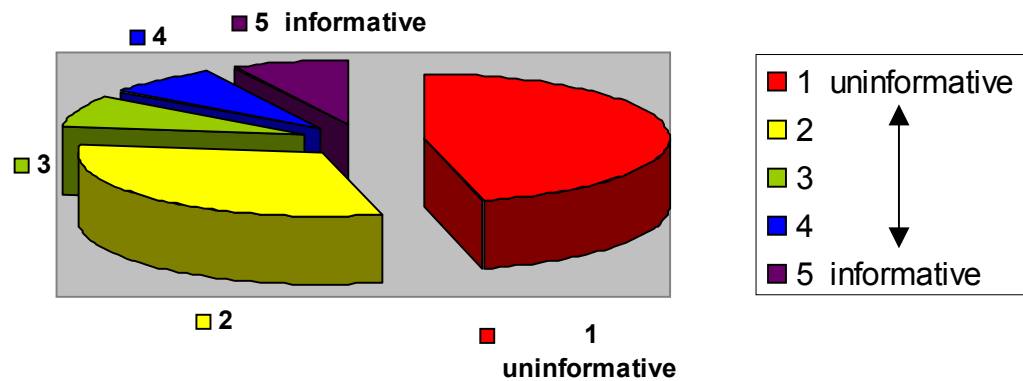
Interior architecture students rated design submissions of architecture students as *informative*. Only two students indicated architecture students submitted *uninformative* design material. The ratings of 4 and 5 were the same, indicating *informative* design submissions (Figure 6.8).



**Figure 6.8** Design submissions were informative- uninformative (int. arch. students)

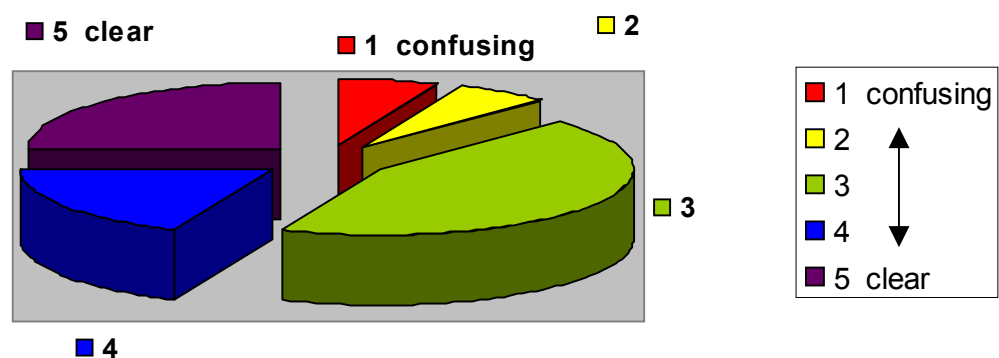
Contrary to interior architecture students, architecture students found design submissions mostly *uninformative*. Majority of them rated 1 and 2, indicating

*uninformative* submissions. Only two students indicated that they were satisfied in terms of design submissions' information (Figure 6.9).



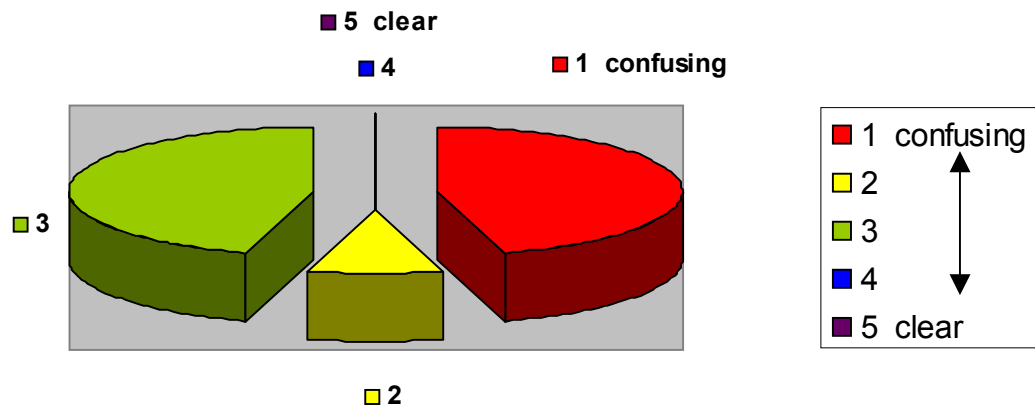
**Figure 6.9** Design submissions were informative- uninformative (arch. students)

Interior architecture students understood design submissions. They indicated architecture students sent them *clear* design materials. Only two of them rated 1 and 2 indicating *confusing* submissions (figure 6.10).



**Figure 6.10** Design submissions were clear- confusing (int. arch. students)

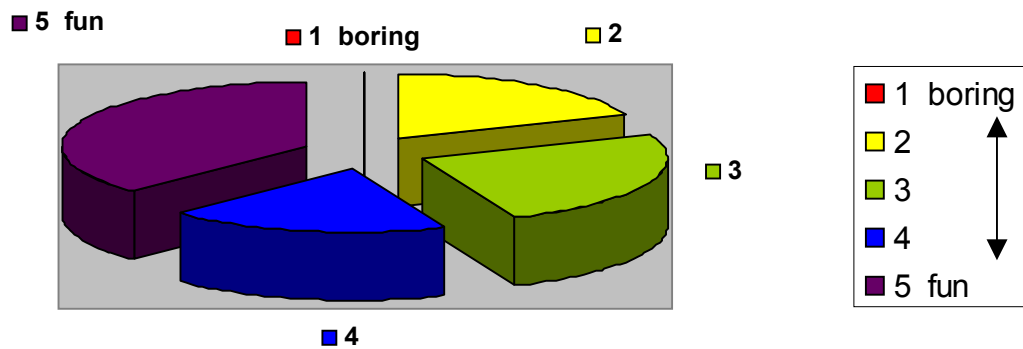
According to architecture students design submissions they received were *confusing*. However three students were uncertain, and three of architecture students rated 1 indicating design submissions were mostly *confusing*. None of the students rated 4 or 5 indicating *clear* design submissions (Figure 6.11).



**Figure 6.11** Design submissions were clear- confusing (arch. students)

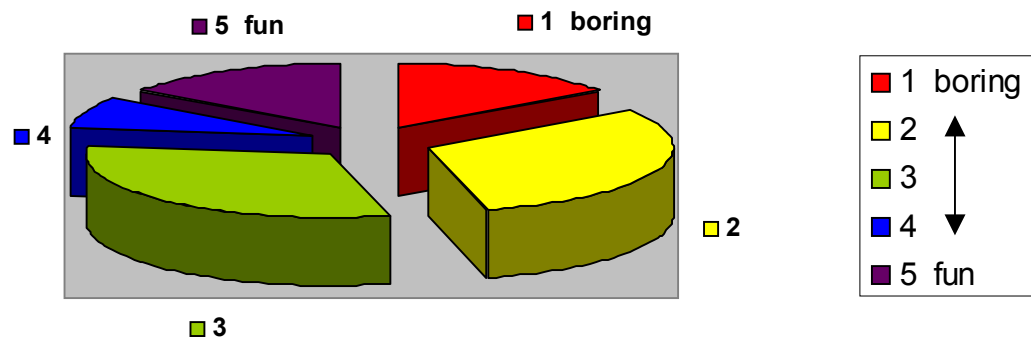
According to interior architecture students, collaboration with architecture students was *fun*. None of the students rated 1 indicating *boring*. However, three students rated as 2 indicating *nearly boring*. Majority of the interior architecture students rated 5, indicating *fun* (Figure 6.12).





**Figure 6.12** Collaboration was boring-fun (int. arch. students)

Architecture students enjoyed this collaboration too. Majority of architecture students indicated contentment for having *fun* (Figure 6.13).



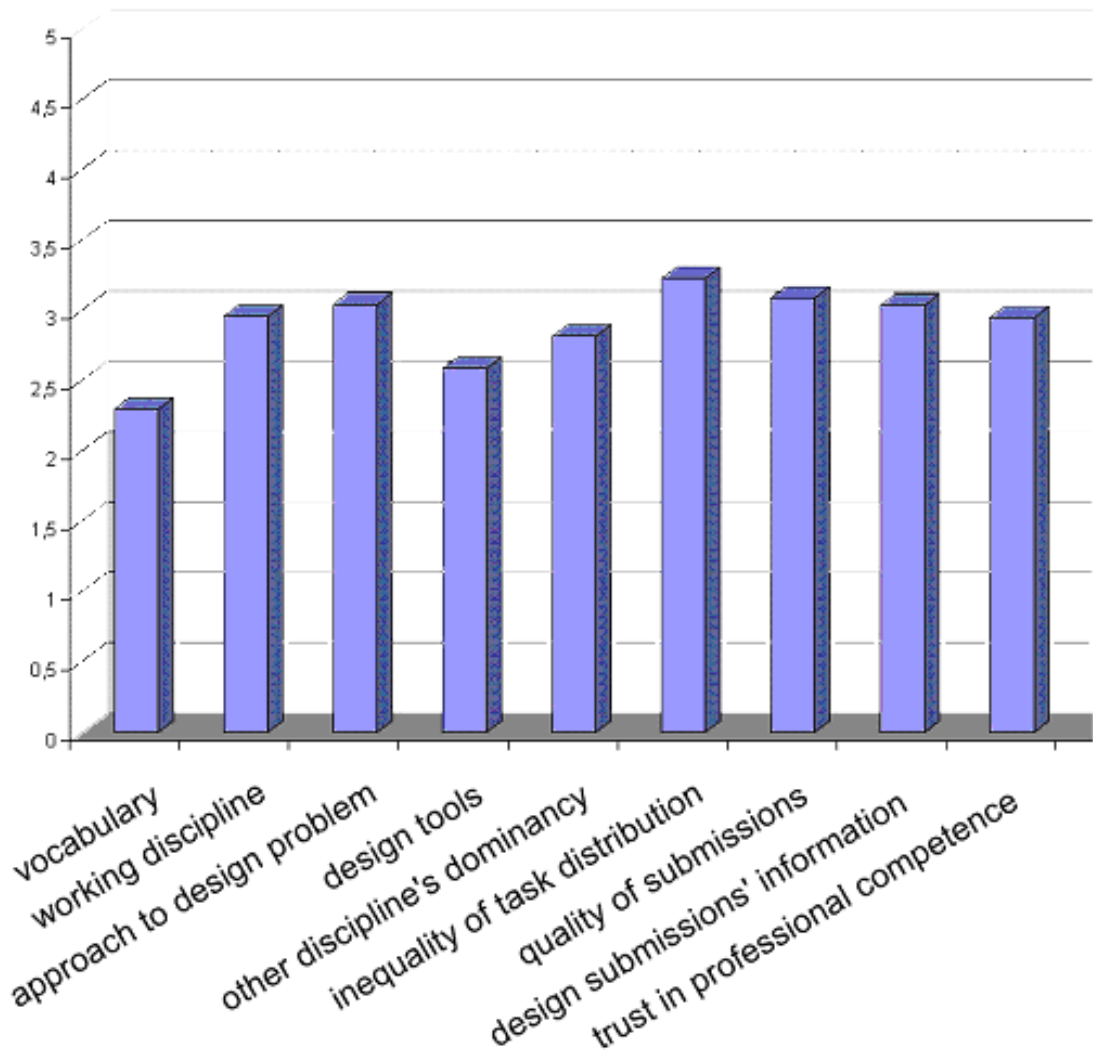
**Figure 6.13** Collaboration was boring-fun (arch. students)

#### 6.1.4. Evaluation of Strongest and Weakest Aspects of Collaboration with the Other Discipline (questions 17 and 18)

A set of open-ended questions asked the students the strongest and the weakest points in collaborating with the other discipline. Interior architecture students majorly indicated opinions related to “richness of views” as the strongest aspect, while they majorly pointed out that architecture students were not aware of what interior architects were responsible of. On the other hand, similar to interior architecture students, architecture students also referred to the richness of ideas as the strongest aspect of collaboration, whereas they majorly stated the opinion that they would have achieved almost the same results without the contribution of the interior architecture students.

#### **6.1.5. Students’ Comments on the Problems in the Collaboration with Another Discipline (question 21)**

A table comprising pre-determined problems that could affect the collaboration was given with a 1 to 5 scale of frequency, where students would indicate the occurrence of a problem between 1 as never to 5 as always. The types of problems grouped as: *incompability of vocabularies, difference in working discipline, approach to design problems, incompatibility of design tools, dominancy when deciding a solution, inequality of task distribution, quality of design submissions and using different media* (Figure 6.14).



**Figure 6.14** Problems for both disciplines

Quality of design submissions and different approaches from different disciplines were other majorly recognized problems in encounter of disciplines. The incompatibility of vocabularies was rated least among all stated problems.

## **6.2. Evaluations**

There are three major dimensions to evaluate in this study: validity of argument, sufficiency of technical platform and effects of this platform, and finally cultural dimension: participating students were not only from different disciplines but also from different cultures.

### **6.2.1. Encounter of Disciplines**

As Rummel et al. (2005) states, interdisciplinary collaboration is a situation of “complementary expertise” (p. 4). In interdisciplinary collaboration, collaborators complement one another in that each of them possesses a relevant part of the unshared knowledge.

In this study, each student was not a novice in the other’s domain and at same time was not an expert in his own. Because boundaries of architecture and interior architecture is so undetermined that students are confused. Although students indicated collaboration was fun, interdisciplinary collaboration is not an easy undertaking (Lewis & Sycara; 1993) (cited in Rummel et al., 2005).

In this study, students’ opinions in the recognition of several types of problems in the encounter of disciplines were asked. Both student groups indicated that collaboration was necessary in their education and for professional life (Figure 6.3, p. 55). However, when it came to the evaluation of collaboration with the other discipline architecture

students seemed to find collaboration unnecessary, claiming that they could have done the project all by themselves. On the other hand, based on the findings of the case study indicating no major rejection of this generation of students towards the use of web-based techniques in the design studio and the background of the student group experienced in using computers and Internet, it is hard to blame the difficulties faced with throughout the collaborative study on technical issues.

Students themselves referred to the “inequality of task distribution”, and the “limited information content” in the design submissions, as well as the “incompability of task scheduling” as the troubling issues in making the collaboration *difficult*. In general, students recognized the existence of all the problems. The problem that was rated the most (even with a slightest amount) was the *inequality of task distribution*, indicating the validity of the argument of this thesis.

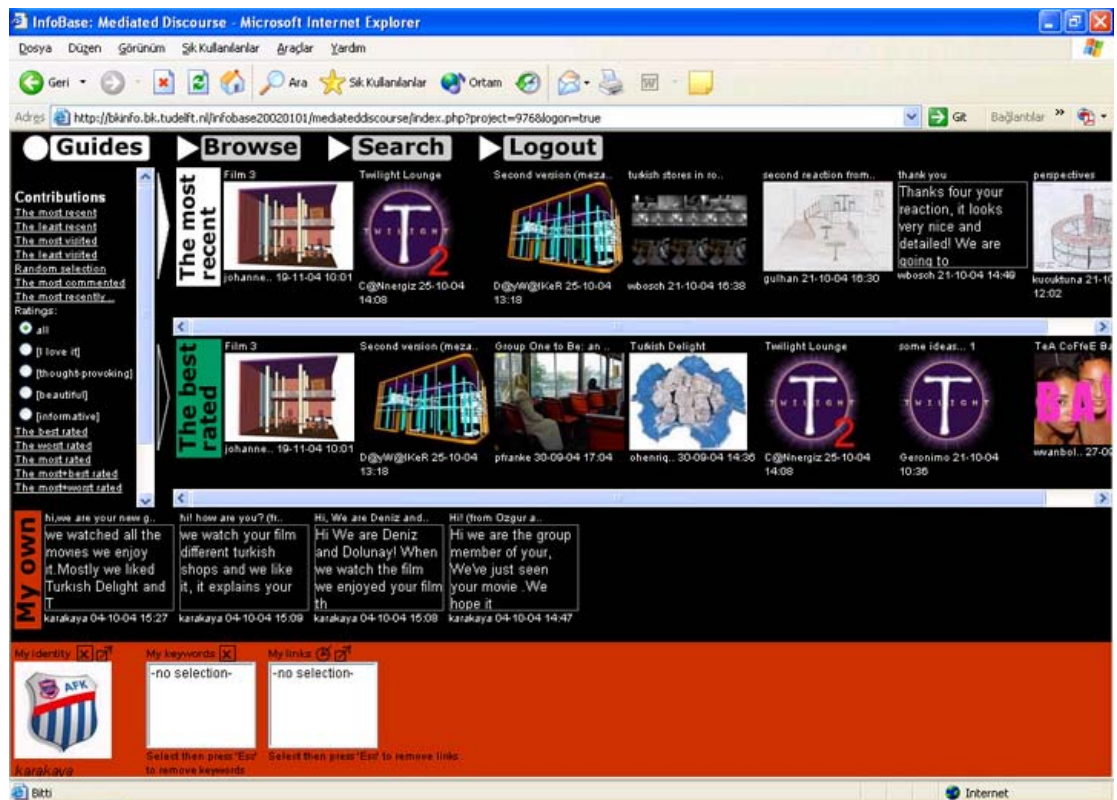
Although, interior architecture students sent design ideas in a familiar format (architectural plans, sections, perspectives and 3D models), architecture students insistingly indicated that these design submissions were *confusing* (Figure 6.11). On the other hand, interior architecture students had to watch, and interpret not drawings, but short movies sent by architecture students; they did not complain that these movies were unfamiliar as format or confusing as design submissions (Figure 6.10).

This situation demonstrates uncomfot of architecture students in collaboration with interior architecture students. Architecture students did not seem to be satisfied even with the well informed, dimensioned, rendered, detailed, and furnished plans, sections

and perspectives. This discomfort of the architecture students in collaboration again supports the argument of this thesis. Even though both groups indicated that the collaboration was fun, and even though they indicated that they would be willing to collaborate in the future, existence of disharmony even in this educational case supports the view that there are problems. In the encounter of disciplines that need to be discussed and prepared for during design education.

### **6.2.2. InfoBase**

The graphical interface of the InfoBase, along with downloadable audio and video clips provided a level of interesting and entertainment that encouraged substantive input from virtual visitors to the site. Student portraits and biographies are bigger than life and connected to work to reflect a friendly interface to visitors and to get beyond the 'empty image syndrome' (images with no connection to person whom created it) of many Web sites (Fowler, 1996) (Figure 6.15).



**Figure 6.15** User interface of InfoBase

Akar et al. (2005) evaluated InfoBase in terms of its usability, usefulness, and experience of users about their group work. The results of the applied questionnaire and the interviews have shown that students faced some problems when they wanted to navigate in the environment. These problems may affect students when they want to search for the root of the concept development. User interface should be more usable.

Also some students indicate problems about adding a negative comment open to public (Akar et al., 2003). Students sometimes need private communication to send their negative comments. For this reason in “Turkish Store in the Netherlands” project they could use Weblog or Microsoft MSN Messenger. A Turkish student who participated in TUDelft- METU case study said:

“The other communication tools like e-mail, MSN were good assistants for communicating with the others. As a group we

spent lots of time on MSN to decide, describe, and discuss the project.” (Akar et al., 2003, p.XX)

Akar et al. (2003) states complaints about the rating system. The rating system should be modified. Access to rating system should be limited because some students rated their projects repeatedly. Possibility of giving plural ratings decreases reliability of the rating system.

Although InfoBase is a web site, bulletin board, calendar or private group spaces are not available. For this reason students used Weblog as a group space and as a bulletin board.

Concerning the problems and complaints, it can be said that InfoBase has to be developed to supported learners. In these settings, InfoBase provides enough support for students from different disciplines to generate a common design concept.

### **6.2.3. Encounter of Cultures**

“Universities should not be involved in cultural imperialism. Knowledge should not be monopolized by one country or one institution. The search for global solutions requires universities to co-operate and to share information. International education should receive the support of national governments” (Alladin, 1992, p. 27).

The participant students of this study were selected from two different cultures. All interior architecture students were Turkish, and architecture students were composed of 17 Dutch, 3 Dutch/Turkish, and one Dutch/Iranian student. Cultural differences were consciously provacated; the design project was a Turkish store in the Netherlands. As Kwan and de Witt (1995) state “a process which integrates an international/intercultural dimension into the teaching, research and service functions



of higher education institutions” (p.18) (cited in UNESCO Commission IV, Final Report) was another purpose and was adopted in this study as well. Yet, this thesis focuses on encounter of disciplines side of the case study; encounter of cultures side of the case study will be researched by TUDelft and Bilkent universities in an another publication.

One of the primary problems about encounter of cultures was language. None of the participant students were native English speakers. In Bilkent University all courses are offered in English, however, in their design studio they communicate their instructors and their friends in Turkish. In TUDelft, courses are offered both in Dutch and in English. Architecture students mostly speak Dutch in their education life as well as their design studio. To cope with language problem, Turkish architecture students in the Netherlands, act like an interpreter between Dutch students and Turkish students in their group. They mostly used text based communication tools, so that they were able to use electronic and on-line dictionaries.

## 7. CONCLUSION

In today's design practice, the rapid growth of information and telecommunication technologies, in combination with increasing specialization of design knowledge, results in a growing need for interdisciplinary collaboration. Designers from different disciplines have to cope with working together in order to succeed in solving the design problems at hand (Rummel et al., 2005). The investigation of collaboration between geographically distributed interdisciplinary design students is the focus of this thesis. The need for the encounter of design students during their education turns out to be an asset through this investigation.

The similarities and dissimilarities of the disciplines and the differences in the social and cultural contexts provided a rich setting for exploring cross-cultural design collaboration and understanding of interdisciplinary spatial processes. In addition, the collaborative experience provided an opportunity for critical reflection on the discipline-space relationship.

This study suggests potential ways to overcome the obstacles encountered in the professional community as well as inter-disciplinary collaboration and cooperation, and advocates the educational and social utility of such collaboration.

The project had a number of educational benefits for the students; they:

- Gained an appreciation of the other discipline, its tasks and the interpretation of these in design;

- Better understood the function of the design studio and its role in the design process
- Experienced that the discipline differences, opinion and beliefs are central to collaborative project of this kind.

The findings demonstrate that web-based collaborative learning contributes to the education of different disciplines, in terms of sharing richer ideas, experimenting professional communication and handling a task distribution. Working through an Internet site also decreases problems of geographical distribution and time related constraints on a large scale.

Working with architecture students contributed to the education of interior architecture students according to findings of case study. They recognized domain of architecture, perceived overlapping of boundaries between two disciplines. This study was a 'role playing', prepared students for the challenging conditions of today's interdisciplinary professional practice. Similarly, architecture students recognized domain of interior architecture. Although they were not satisfied in terms of design submissions quality and information, they noticed that interior architects be able to contribute design process. Both disciplines stated working with another discipline in educational and professional life is necessary.

The findings showed that the vocabularies and design criteria for both student groups were similar. There was no trust problem between disciplines. However architecture students stated that the task distribution was not equal. Among architecture students there was a tendency to see themselves as capable of doing all design tasks; somewhat rejecting other professionals.

This may lead them to think like this later in professional life, which may result in conflicting situations. Collaborations like the one in this study may help in realizing the encounter before professional life, demonstrating possible problems and hopefully some solutions.

In the future, universities will encourage collaboration between disciplines and cultures. UNESCO Commission IV Final Report supports this assumption:

“The emerging international higher education community that is uniting leading thinkers and actors in all nations will play a decisive role in building lasting partnerships between countries.... in this perspective... higher education will change radically during the next 20 years:

- universities increasingly will become "motors" of development through responding to powerful market forces and through their experiences in international partnerships;
- higher education will become more intimately linked not only to social and economic development, but also to educational and cultural development. The "safe space" of higher education and the growth of university autonomy will encourage rapid cultural growth, the improvement of basic education systems and more decentralized governance;
- greater interdisciplinarity will enable a better focus on key development problems. Universities that resist the development of interdisciplinary programmes in high priority cross-sectoral areas will not flourish;
- policy dialogue will be used increasingly by institutions of higher education and all types of post-secondary educational institutions to contribute to local and national development processes;
- post-secondary education will begin to play, of necessity, a decisive role in preventing crises and in stabilizing societies enduring conflicts and natural disasters, and in recreating national systems during transitions;
- decentralized learning resources will be made widely accessible through the rapid development of distance learning systems and community learning centers...” (UNESCO, 2005, p. 38)

Higher education partnerships will gain importance because of their low costs and cost-effectiveness, because donor investments are highly leveraged through the active participation of many partners (UNESCO, 2005). Universities attract leading professors and researchers, additional students who are interested in the many fields requiring international cooperation, and greater funding from the private sector for programmes beneficial to their businesses and organizations.

To serve as useful vehicles for international higher education exchange, partnerships must be successful in achieving specific development goals. Key criteria and steps for developing productive and sustainable partnerships are:

1. Balanced, reciprocal relationships are essential;
2. All partners should participate in planning, implementation and evaluation processes of the partnership;
3. A shared vision must be created that leads to building a relationship of trust;
4. The benefits for all partners must be identified, reviewed frequently and achieved;
5. An Action Plan should be developed jointly with responsibilities and timelines for all partners;
6. Clear lines of communication between partners and their supporters must be established and nourished;
7. Face to face exchange visits including all supporters are essential; e-mail and teleconferences are not enough to sustain long-term commitments;
8. Concrete partnership programmes should include higher education development activities, that could entail the exchange of curricula, focused research endeavors, internal and external evaluations, community outreach strategies, and similar topics;
9. Achievements, problems and needs of the partnership must be reviewed periodically by all partners and supporters of the partnership;
10. Partnerships must be flexible and open to adding new partners, re-prioritizing activities and revising Action Plans (UNESCO, 2005, p. 49)

Based on UNESCO's list and the findings of this thesis, a list may be proposed for productive collaborations during design education:

1. Design education should accommodate collaborative implementations between different design related disciplines.
2. The groups involved in the collaboration should be monitored to have a balanced task distribution and should all be involved in planning, implementation and evaluation process.
3. Student groups should be encouraged to be aware of the domains of other design disciplines.
4. Videoconferences are useful to compensate for the lack of face-to-face encounters.
5. Design collaborations should involve submissions from all formats such as drawing, text, photo, video, audio etc. in order to enhance design communication.
6. After each collaborative work, the comments, products, problems need to be discussed in detail in order to establish better collaborative frameworks in the future.
7. The interdisciplinary tensions that may occur during the collaboration should be closely monitored and solutions geared towards the elimination of these tensions need to be integrated into design curricula.

## 8. BIBLIOGRAPHY

- Achten, H.H. (2002). "Requirements for collaborative design in architecture". Timmermans, Harry (Ed.), *Sixth Design and Decision Support Systems in Architecture and Urban Planning - Part one: Architecture Proceedings*. Avegoor, the Netherlands
- Agerup, K and Büsser, M. (2005). "A case study on collaborative learning in distributed, cross-cultural teams" Retrieved May 22, 2005 from the World Wide Web:  
[succeednow.org/icee/Abstracts/430\\_Abstract\\_\(1\).pdf](http://succeednow.org/icee/Abstracts/430_Abstract_(1).pdf)
- Akar, E., Tunçer, B., Stouffs, R. & Attema, J. (2003). "Design and evaluation of a collaborative virtual space" in 9<sup>th</sup> EIA Conference Proceedings. İstanbul, Turkey, 3-12.
- Alladin, I. (1992). "International co-operation in higher education: the globalization of universities", *Higher Education in Europe*, CEPES, Bucharest.
- Blogger web site. Retrieved May 22, 2005 from the World Wide Web:  
<http://www.blogger.com>
- Boyer, E.L. & Mitgang, L.D. (1996). *Building Community: A New Future for Architectural Education and Practice*. Princeton, NJ: The Carnegie Foundation for the Advancement of Teaching.
- Broadfoot, O. & Bennett, R. (2001). "Design studios: online? Comparing traditional face-to-face design studio education with modern Internet-based design studios". Retrieved May 22, 2005 from the World Wide Web:  
[auc.uow.edu.au/conf/conf03/papers/AUC\\_DV2003\\_Broadfoot.pdf](http://auc.uow.edu.au/conf/conf03/papers/AUC_DV2003_Broadfoot.pdf)
- Brandon, D. P. & Hollingshead, A. B. (1999). "Collaborative learning and computer supported groups". *Communication Education*, 48 (2), 109-126.
- Chafee, R. (1977). "The teaching of architecture at the Ecole des Beaux-Arts" in Drexler, A.(ed.) *The Architecture of the Ecole des Beaux-Arts*. Cambridge, MA: MIT Press.
- Carlhian, J. P. (1979). "The Ecole des Beaux-Arts: Modes and manners" *Journal of Architectural Education*, 33(2), 7-17.
- Cheng, N. & Kvan, T. (2000). "Design Collaboration Strategies", In SiGraDi 2000: 4th Iberoamerican Congress of Digital Graphics, J Ripper Kos, A Pessoa Borde, D Rodriguez Barros (Ed.s), Rio de Janeiro, Brasil.
- Chitoran, D. (2005). "International co-operation in higher education: Trends, issues, challenges and new avenues for the 21st century". Retrieved May 22, 2005 from the World Wide Web:  
[portal.unesco.org/education/en/ev.php-URL\\_ID=7272&URL\\_DO=DO\\_TOPIC&URL\\_SECTION=201.html](http://portal.unesco.org/education/en/ev.php-URL_ID=7272&URL_DO=DO_TOPIC&URL_SECTION=201.html)

- Chiu, M. L. (2001). "An organizational view of design communication in design collaboration". *Design Studies*, 23 (2), 187-210.
- Chiu, M. L., Yamaguchi S. & Morozumi, M. (2001). "Supporting collaborative design studios – Scenarios and tools". in CAADRIA 2001 Proceedings, John S. Gero, Scott Chase and Mike Rosenman (Ed.s), Key Centre of Design Computing and Cognition, University of Sydney, 125-134.
- Collins, P. (1979). "The 18 th century origins of our system of full-time architectural schooling." *Journal of Architectural Education*, 33 (2), 2-6.
- Craig, D. L. & Zimring, C., (2000). "Supporting collaborative design groups as design communities". *Design Studies*, 21, 187–204.
- De Wit, H. (ed.) (1995). *Strategies for Internationalization of Higher Education, A Comparative Study of Australia, Canada, Europe and the United States of America*, EAIE, Amsterdam.
- Devon, R., Saintive, D., Hager, W., Nowé, M., & Sathianathan, D. (1998). "Alliance by design: An international student collaboration". In Proceedings of ASCE Annual Conference, Seattle, WA.
- Dillenbourg, P. (1999). *Collaborative Learning: Cognitive and Computational Approach*. Elsevier Science Ltd: Oxford, UK.
- Egbert, D. D. (1980). *The Beaux-Arts tradition in French architecture*. Princeton, N.J. :Princeton University Press.
- Fenves, S. (1995). "An interdisciplinary course in engineering synthesis". In Proceedings of 2<sup>nd</sup> ASCE Congress of Computing in Civil Engineering, ASCE, New York, NY, 433-440.
- Fiedler, S. (2001). "The studio experience: A case study on self-direction in learning within a formal instructional setting". PhD. Thesis, Friedrich-Alexander University, Erlangen-Nürnberg, Germany.
- Fowler, T. (1996). "Design web chats: A virtual community". Broadening Our Horizons: Information, Services, Technology Proceedings of the 1996 CAUSE Annual Conference.
- Fruchter, R. (1999). "AEC teamwork: A collaborative design and learning space". *Journal of Computing in Civil Engineering*, 13 (4), 261-269.
- Fussell, S.R., Kraut, R. E., Lerch, F. J., Scherlis, W. L., McNally, M. M. & Cadiz, J.J. (1998). "Coordination, overload and team performance :effects of team communication strategies". In Proceedings of the ACM 1998 Conference on CSCW, Seattle, WA, USA, 275-284.



- Gasen, J. B. (1996). "New metaphors for collaborative learning." Retrieved May 22, 2005 from the World Wide Web:  
[www.educause.edu/ir/library/pdf/CNC9664.pdf](http://www.educause.edu/ir/library/pdf/CNC9664.pdf)
- Grant, P.M. and Lindsay, M. (1997). "C.R.E.D.I.T (Collaborative Research in Education for Designers using IT)". In eCAADe 1997 Challenges of the Future, Proceedings of the 15th Conference on Education in Computer Aided Architectural Design in Europe, Bob Martens, Helena Linzer, Andreas Voigt (Ed.s), Vienna, Austria.
- Gross, M & Do, E. (1997). "Integrating Digital Media in Design Studio: Six Paradigms." In Proceedings of ACSA National Conference, Minneapolis, Minn.
- Gutwin, C. & Greenberg, S. (2000). "Effects of awareness support on groupware usability." Retrieved May 22, 2005 from the World Wide Web:  
<http://www.cpsc.ucalgary.ca/grouplab/papers>
- InfoBase web site. Retrieved May 22, 2005 from the World Wide Web:  
<http://bkinfo.bk.tudelft.nl/infobase20020101/mediateddiscourse/index.php?project=976>
- International Union of Architects (UIA) (1998). Accord on Recommended International Standards of Professionalism in Architectural Practice Revised Second Edition. Retrieved May 22, 2005 from the World Wide Web:  
<http://www.aij.or.jp/jpn/aijedu/UIAAccord.doc>
- International Federation of Interior Architects/Interior Designers (IFI) (2005). Retrieved May 22, 2005 from the World Wide Web:  
[http://www.ifeworld.org/about\\_definition.htm](http://www.ifeworld.org/about_definition.htm)
- Johnson, B. R. (2000). "Sustaining studio culture: How well do Internet tools meet the needs of virtual design studios?". In eCAADe 2000 Promise and Reality, Proceedings of the 18th Conference on Education in Computer Aided Architectural Design in Europe, Donath, D. (Ed.) Weimar, Germany, 15-21.
- Johnson, D. W. (1971). "Effectiveness of role reversal: Actor or listener" *Psychological Reports*, 28, 275-282.
- Jones, P. & Kasif, S. (1997). "Communication and collaboration." Retrieved May 22, 2005 from the World Wide Web:  
<http://tortie.me.uiuc.edu/pmj/bog2.html>.
- Knight, J. (1995). *Internationalization at Canadian Universities: The Changing Landscape*, AUCC, Ottawa.
- Lewis, C. & Sycara, K. (1993). "Reaching informed agreement in multispecialist cooperation." *Group Decision and Negotiation*, 2, 279-299.

- Maes, P. (1994). "Agents that reduce work and information overload." *Communications of the ACM*, 37 (7), 31-41.
- Maher, M. L., Simoff, S., and A. Cicognani (1997). Observations from an Experimental Study of Computer-mediated Collaborative Design. Preprints Formal Aspects of Collaborative CAD, pp. 165-186. Retrieved May 22, 2005 from the World Wide Web:  
[http://www.arch.usyd.edu.au/chris\\_a/MaherPubs/marylou97.htm](http://www.arch.usyd.edu.au/chris_a/MaherPubs/marylou97.htm)
- Mason, R. (1994). "Distance Education Across National Borders." In Mary Thorpe and David Grugeon (ed.s), *Open Learning in the Mainstream*. Harlow, Essex: Longman Group Limited, 297-308.
- McCarthy, S. J. & McMahon, S. (1992). "From convention to invention: Three approaches to peer interactions during writing." In Hertz-Lazarowitz & Miller (eds.) *Interaction in Cooperative Groups*, NY, NY: Cambridge University Press.
- Meriam-Webster online dictionary Retrieved May 22, 2005 from the World Wide Web:  
<http://www.m-w.com/cgi-bin/dictionary?book=Dictionary&va=collaborate&x=10&y=18>
- Nystrand, M. (1986). "Learning to write by talking: A summary of research on intensive peer review in expository writing at the University of Wisconsin, Madison." In Nystrands (ed.) *The Structure of Written Communication*, Orlando, FL: Academic Press.
- O'Brien, W. (2000). "Implementation issues in project web-sites: a practitioner's Viewpoint." *Journal of Management in Engineering*, 16 (3), 34-39.
- Panitz, T. (2005a). "Collaborative versus cooperative learning- A comparison of the two concepts which will help us understand the underlying nature of interactive learning." Retrieved May 22, 2005 from the World Wide Web:  
<http://home.capecod.net/~tpanitz/tedsarticles/coopdefinition.htm>
- Panitz, T. (2005b). "The case for student centered instruction via collaborative learning paradigms." Retrieved May 22, 2005 from the World Wide Web:  
<http://home.capecod.net/~tpanitz/tedsarticles/coopbenefits.htm>
- Panitz, T. and Panitz, P. (1997). "Encouraging the use of Collaborative Learning in Higher Education" *Issues Facing International Education* J.J. Forest (ed.)
- Parker, D., and Rossner-Merrill, V. (1998). "Socialization of distance education: The web as enabler", In *WebNet 98: World Conference of the WWW, Internet, and Intranet Proceedings*, H. Maurer and R. G. Olson (Ed.s). Charlottesville, VA: Association for the Advancement of Computing in Education.
- Peterson, P. & Swing, S. (1985). "Students cognitions as mediators of the effectiveness of small group learning." *Journal of Educational Psychology*, 77 (3), 299-312.

- Poltrock, S. and Engelbeck, G. (1999). "Requirements for a virtual collocation Environment." *Information and Software Technology*, 41, 331-339.
- Rachel, S. and Parnell, R. (2004) "The Review Process", *CEBE Transactions*, 1 (2), 56-69.
- Ragoonaden, K. and Bordeleau, P. (2000). "Collaborative learning via the Internet" *Educational Technology & Society*, 3 (3), ISSN 1436-4522. Retrieved May 22, 2005 from the World Wide Web:  
[http://ifets.ieee.org/periodical/vol\\_3\\_2000/d11.html](http://ifets.ieee.org/periodical/vol_3_2000/d11.html)
- Romice, O. (2005). "Community design studio: A collaboration of architects and psychologists." Retrieved May 22, 2005 from the World Wide Web:  
[www.cebe.heacademy.ac.uk/ transactions/pdf/OmbrettaRomice.pdf](http://www.cebe.heacademy.ac.uk/transactions/pdf/OmbrettaRomice.pdf)
- Rummel, N., Spada, H., Hermann, F., Caspar, F., and Schornstein, K. (2005). "Promoting the coordination of computer-mediated interdisciplinary collaboration: Vicarious learning from worked-out examples and the effects of different technical settings". Retrieved May 22, 2005 from the World Wide Web:  
[newmedia.colorado.edu/cscl/26.pdf](http://newmedia.colorado.edu/cscl/26.pdf)
- Sagun, A. (2003). Evolutionary collaborative design studios. PhD Thesis. Bilkent University, Turkey.
- Schön, D. A. (1987). *Educating the Reflective Practitioner*. San Francisco: Jossey-Bass.
- Schön, D.A. (1985). *The Design Studio: An Exploration of its Traditions and Potentials, Architecture and the Higher Learning*. London: Portland, OR: RIBA Publications for RIBA Building Industry Trust.
- Seidel, H. (1991). "Internationalization: A new challenge for universities." *Higher Education*, 21 (3), 289-296.
- Shaffer, D. W. (2001). "Understanding design learning: The design studio as a model for education." Retrieved May 22, 2005 from the World Wide Web:  
<http://lcs.www.media.mit.edu/groups/el/projects/ew/resaerch/papers.html>
- Simoff, S. J. & Maher, M.L. (1997). "Design education via web-based virtual environments." In Proceedings of 4th ASCE Congress of Computing in Civil Engineering, ASCE, New York, NY, 418-425.
- Soibelman, L., O'Brien, W. & Evlin, G. (2003). "Collaborative design processes: A class on concurrent collaboration in multidisciplinary design." *Journal of Construction Education*, 8 (2), 78-93.
- Şenyapılı, B. & Karakaya, A. F. (2005). "Design studio communication: Young generation holding on to old techniques" In Proceedings of AEC 2005, Rotterdam, the Netherlands.

- Tang, J. C. & Isaacs, E. A., (1992). "Why do users like video? Studies of multimedia-supported collaboration." *Computer Supported Cooperative Work (CSCW)*, 1,163-193.
- UNESCO Commission IV – International Co-operation Final Report. Retrieved May 22, 2005 from the World Wide Web:  
[portal.unesco.org/education/en/file\\_download.php/c0587012ad1205b5897d245e940b60edCommissionIV-E.pdf](http://portal.unesco.org/education/en/file_download.php/c0587012ad1205b5897d245e940b60edCommissionIV-E.pdf)
- Wilson, J. M. & Jennings, W. C. (2000). "Studio courses: How information technology is changing the way we teach, on campus and off," *Proceedings of the IEEE*, 88 (1), 72–80.
- Vanegas, J. & Guzdial, M. (1995). "Engineering education in sustainable development and technology." In *Proceedings of 2nd Congress on Computing in Civil Engineering*, ASCE, New York, NY, 425-432.
- Xie, Y and Salvendy, G. (2003). "Agent-based features for CAD browsers to foster engineering collaboration over the Internet" *International Journal of Production Research*, 41(16), 3809-3829.
- Yee, S. (2001). *Building Communities for Design Education: Using Telecommunication Technology for Remote Collaborative Learning*. PhD Thesis. Massachusetts Institute of Technology, MA.
- Yee, S., William J. Mitchell, Ryusuke Naka, Mitsuo Morozumi, and Sigeyuki Yamaguchi. (1998). "The Kumamoto-Kyoto-MIT collaborative project: A case study of the design studio of the future," *Cooperative Buildings: Integrating Information, Organization, and Architecture*, Proceedings of the First International Workshop, CoBuild '98, Norbert A. Streitz, Sin'ichi Komoni, and Heinz-Jürgen Burkhardt (eds.). Berlin: Springer, 80-93.
- Zhao, J. & Akahori, K. (2001). "Web-based collaborative learning methods and strategies in higher education". Retrieved May 22, 2005 from the World Wide Web:  
[www.eecs.kumamoto-u.ac.jp/ITHET01/proc/139.pdf](http://www.eecs.kumamoto-u.ac.jp/ITHET01/proc/139.pdf)

## APPENDIX A

### A.1. Pilot Study Questionnaire

Name:

Design Studio Year:

E-mail Address:

1. How long have you been using computers?

☐ For ..... year(s)   ☐ Never used

2. For what purposes do you use computer?

☐ Writing   ☐ Drawing   ☐ Internet   ☐ Games   ☐ Others .....

3. How long have you been using Internet?

☐ For ..... year(s)   ☐ Never used

4. For what purposes do you use Internet?

☐ Research   ☐ E-mail   ☐ Chat   ☐ Others .....

5. Which programs did you use to get critique on world wide web?

☐ AutoCad   ☐ 3DSMax   ☐ Photoshop   ☐ Fireworks   ☐ Others .....

6. Did you get critiques before on World Wide Web?

☐ Yes   ☐ No

7. If yes, please explain how?

.....

8. For this study which type of critiques helped you more?

☐ E-mail   ☐ Face to face   ☐ Both of them

9. Please evaluate e-mail critique

| Very helpful | 5                        | 4                        | 3                        | 2                        | 1                        | Not helpful |
|--------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
|              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |             |

10. Please evaluate face to face critique

| Very helpful | 5                        | 4                        | 3                        | 2                        | 1                        | Not helpful |
|--------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
|              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |             |

11. What is the strongest point of e-mail critique?

.....

12. What is the weakest point of e-mail critique?

.....

13. What is the strongest point of face to face critique?

.....

14. What is the weakest point of face to face critique?

.....

**Please answer according to e-mail critiques**

|  |           | 5                        | 4                        | 3                        | 2                        | 1                        |             |
|--|-----------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
| helped me to see lacking/ weakest points of the design | always    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | never       |
| the design was changed after the critique              | agree     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | disagree    |
| understanding the critiques                            | easy      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | difficult   |
| collaboration with the instructor                      | strong    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | weak        |
| collaboration with friends in group                    | strong    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | weak        |
| preparation of presentation                            | easy      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | difficult   |
| quality of presentation                                | satisfied | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | unsatisfied |

**Please answer according to face to face critiques**

|  |           | 5                        | 4                        | 3                        | 2                        | 1                        |             |
|--|-----------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-------------|
| helped me to see lacking/ weakest points of the design | always    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | never       |
| the design was changed after the critique              | agree     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | disagree    |
| understanding the critiques                            | easy      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | difficult   |
| collaboration with the instructor                      | strong    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | weak        |
| collaboration with friends in group                    | strong    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | weak        |
| preparation of presentation                            | easy      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | difficult   |
| quality of presentation                                | satisfied | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | unsatisfied |

**Overall evaluation of the e-mail critique**

|             | 5                        | 4                        | 3                        | 2                        | 1                        |                 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------|
| Easy        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Difficult       |
| Flexible    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Rigid           |
| Quick       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Time- consuming |
| Stimulating | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Dull            |
| Clear       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Confusing       |

**Overall evaluation of the face to face critique**

|             | 5                        | 4                        | 3                        | 2                        | 1                        |                 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------|
| Easy        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Difficult       |
| Flexible    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Rigid           |
| Quick       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Time- consuming |
| Stimulating | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Dull            |
| Clear       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Confusing       |

## A.2. Background Questionnaires

### A.2.1. TUDelft Questionnaire

Age .....  
Gender Male ☐ Female ☐  
Discipline Architecture ☐ Interior Architecture ☐  
Nationality .....  
Computer at home? Yes ☐ No ☐  
Linked to the Internet at home? Yes ☐ No ☐  
Years of computer experience .....  
Years of internet experience .....  
InfoBase experience? Yes ☐ No ☐  
Collaborative study experience? Yes ☐ No ☐

Please indicate whether you agree or disagree with each statement. Use the following scale to guide your responses to each statement:

1 = Strongly disagree, 2 = Mostly disagree, 3 = Uncertain, 4 = Mostly agree, 5 = Strongly agree

I feel confident using the Internet/ World Wide Web.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using E- mail.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using WWW Browsers.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using search engines.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using an E- learning platform.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using Messenger service.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using the Internet forum/ web log.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

When using a computer, I prefer to learn through trial and error.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I usually get frustrated when using a computer.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Computers make my tasks simpler.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Other people seem to be more skilful at using computer than myself.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I often feel scared when using a computer.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|



I often feel isolated from other people when using a computer.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel more at ease using a computer when alone than a group of people.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Turkish students will be interesting.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Turkish students will be informative.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Turkish students will be difficult.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Turkish students will be (please specify):.....

Collaboration with Interior Architecture students will be interesting.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Interior Architecture students will be informative.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Interior Architecture students will be difficult.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Interior Architecture students will be (please specify):.....

What do you expect from this collaborative study? (You can choose more than one)

- |  |   |
|--|---|
| <input type="checkbox"/> fun               | <input type="checkbox"/> contacts for future collaboration                      |
| <input type="checkbox"/> group discussions | <input type="checkbox"/> learn about another discipline (Interior Architecture) |

Have you ever collaborated with people from another discipline? Yes ☐ No ☐

Have you ever entered a Turkish store in the Netherlands? Yes ☐ No ☐

If yes, what kind of store? Where? .....

Have you ever been to Turkey? Yes ☐ No ☐

If yes, for which purpose? (e.g., vacation, work, study...):.....

Do you have Turkish friends? Yes ☐ No ☐

If yes, where do they live? Turkey ☐ the Netherlands ☐ Other ☐ .....

### A.2.2. Bilkent Questionnaire

Age .....  
Gender Male ☐ Female ☐  
Discipline Architecture ☐ Interior Architecture ☐  
Nationality .....  
Computer at home? Yes ☐ No ☐  
Linked to the Internet at home? Yes ☐ No ☐  
Years of computer experience .....  
Years of internet experience .....  
Collaborative study experience? Yes ☐ No ☐

Please indicate whether you agree or disagree with each statement. Use the following scale to guide your responses to each statement:

1 = Strongly disagree, 2 = Mostly disagree, 3 = Uncertain, 4 = Mostly agree, 5 = Strongly agree

I feel confident using the Internet/ World Wide Web.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using E- mail.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using WWW Browsers.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using search engines.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using an E- learning platform.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using Messenger service.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel confident using the Internet forum/ web log.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

When using a computer, I prefer to learn through trial and error.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I usually get frustrated when using a computer.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Computers make my tasks simpler.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Other people seem to be more skilful at using computer than myself.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I often feel scared when using a computer.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I often feel isolated from other people when using a computer.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

I feel more at ease using a computer when alone than a group of people.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Dutch students will be interesting.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Dutch students will be informative.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Dutch students will be difficult.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Dutch students will be (please specify):.....

Collaboration with Architecture students will be interesting.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Architecture students will be informative.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Architecture students will be difficult.

|   |   |   |   |   |
|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|

Collaboration with Architecture students will be (please specify):.....

What do you expect from this collaborative study? (You can choose more than one)

☐ fun

☐ contacts for future collaboration

☐ group discussions

☐ learn about another discipline (Architecture)

Have you ever collaborated with people from another discipline?

Yes ☐

No ☐

Have you ever been to the Netherlands?

Yes ☐

No ☐

If yes, for which purpose? (e.g., vacation, work, study...):.....

Do you have Dutch friends?

Yes ☐

No ☐

If yes, where do they live?

Turkey ☐

the Netherlands ☐

Other ☐ .....

### A.3. Final Questionnaires

#### A.3.1. TUDelft Questionnaire

Age .....

Gender Male ☐ Female ☐

Nationality .....

1. Please indicate whether you agree or disagree with each statement. Use the following scale to guide your responses to each statement: strongly agree (6)... strongly disagree (1).

| Working with interior architecture students...             | strongly<br>agree        | agree                    | slightly<br>agree        | slightly<br>disagree     | disagree                 | strongly<br>disagree     |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|  | 6                        | 5                        | 4                        | 3                        | 2                        | 1                        |
| made me learn more.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| made me more excited.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| led to a more successful design .                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| developed the project in a way that I would hardly imagine | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| made me realize the domain of interior architecture.       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| made me feel confident as an architect.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| contributed to the formulation of design solutions.        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

2. I felt that I was clearly expressing myself to the interior architecture students.

Yes ☐ No ☐

3. Will you be willing to collaborate with interior architecture in the future?

Yes ☐ No ☐

Why?.....

4. Do you think that collaboration with interior architecture is necessary in university education?

Yes ☐ No ☐

Why?.....

5. Do you think that collaboration with another discipline is necessary in professional life?

Yes ☐ No ☐

Why?.....

6. If other group members were not interior designers.....

- .....
7. Please indicate whether you agree or disagree with each statement. Use the following scale to guide your responses to each statement: strongly agree (6)... strongly disagree (1).

| Working with Turkish students ...                          | strongly<br>agree        | Agree                    | slightly<br>agree        | slightly<br>disagree     | disagree                 | strongly<br>disagree     |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|  | 6                        | 5                        | 4                        | 3                        | 2                        | 1                        |
| made me learn more.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| made me more excited.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| led to a more successful design .                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| developed the project in a way that I would hardly imagine | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I find I change my behaviour to adapt to theirs.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I have very little respect for people from my culture.     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

8. I felt that I was clearly expressing myself to a foreigner.

Yes ☐ No ☐

9. Would you willingly collaborate with members of another culture in the future?

Yes ☐ No ☐

10. Do you think that collaboration with members of another culture is necessary in university education?

Yes ☐ No ☐

Why?.....

11. Do you think that collaboration with another culture is necessary in professional life?

Yes ☐ No ☐

Why?.....

12. If other group members were Dutch.....

15. Overall evaluation of collaboration with another discipline

|             |                          |                          |                          |                          |                          |                 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------|
|             | 5                        | 4                        | 3                        | 2                        | 1                        |                 |
| Easy        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Difficult       |
| Flexible    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Rigid           |
| Quick       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Time- consuming |
| Informative | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Uninformative   |

Clear      ☐      ☐      ☐      ☐      ☐      Confusing

16. Overall evaluation of collaboration with another culture

|             |                          |                          |                          |                          |                          |                 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------|
|             | 5                        | 4                        | 3                        | 2                        | 1                        |                 |
| Easy        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Difficult       |
| Flexible    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Rigid           |
| Quick       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Time- consuming |
| Informative | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Uninformative   |
| Clear       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Confusing       |

17. What are the strongest points of collaboration with interior architecture?

.....

18. What are the weakest points of collaboration with interior architecture?

.....

19. What are the strongest points of collaboration with members of another culture?

.....

20. What are the weakest points of collaboration with members of another culture?

.....

| In collaboration with interior architecture students... | always                   | frequently               | sometimes                | rarely                   | never                    |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | 5                        | 4                        | 3                        | 2                        | 1                        |
| incompability of vocabularies was a problem.            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| difference in working discipline was a problem.         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| approach to design problems was a problem.              | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| incompability of design tools was a problem.            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| they were dominant when deciding a solution.            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| task distribution was equal                             | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| using different media was a problem.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| In collaboration with Turkish students...                       | always                   | frequently               | sometimes                | rarely                   | never                    |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | 5                        | 4                        | 3                        | 2                        | 1                        |
|   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| using different language was a problem.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| difference in working discipline was a problem.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| approach to design problems was a problem.                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| people were the same despite outward differences in appearance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| they do not have the same values and goals as Dutch students.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

### A.3.2. Bilkent Questionnaire

Age .....

Gender Male ☐ Female ☐

Nationality .....

Please indicate whether you agree or disagree with each statement. Use the following scale to guide your responses to each statement: strongly agree (6)... strongly disagree (1).

| Working with architecture students...                      | strongly<br>agree        | agree                    | slightly<br>agree        | slightly<br>disagree     | disagree                 | strongly<br>disagree     |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|  | 6                        | 5                        | 4                        | 3                        | 2                        | 1                        |
| made me learn more.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| made me more excited.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| led to a more successful design .                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| developed the project in a way that I would hardly imagine | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| made me realize the domain of interior architecture.       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| made me fell confident as an architect.                    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| contributed to the formulation of design solutions.        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

13. I felt that I was clearly expressing myself to the architecture students.

Yes ☐ No ☐

14. Will you be willing to collaborate with architecture in the future?

Yes ☐ No ☐

Why?.....

15. Do you think that collaboration with architecture is necessary in university education?

Yes ☐ No ☐

Why?.....

16. Do you think that collaboration with another discipline is necessary in professional life?

Yes ☐ No ☐

Why?.....

17. If other group members were not architects.....

.....



18. Please indicate whether you agree or disagree with each statement. Use the following scale to guide your responses to each statement: strongly agree (6)... strongly disagree (1).

| Working with Dutch students ...                            | strongly<br>agree        | Agree                    | slightly<br>agree        | slightly<br>disagree     | disagree                 | strongly<br>disagree     |
|--|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|  | 6                        | 5                        | 4                        | 3                        | 2                        | 1                        |
| made me learn more.  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| made me more excited.                                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| led to a more successful design .                          | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| developed the project in a way that I would hardly imagine | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I find I change my behaviour to adapt to theirs.           | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| I have very little respect for people from my culture.     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
|  | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

19. I felt that I was clearly expressing myself to a foreigner.

Yes ☐ No ☐

20. Would you willingly collaborate with members of another culture in the future?

Yes ☐ No ☐

21. Do you think that collaboration with members of another culture is necessary in university education?

Yes ☐ No ☐

Why?.....

22. Do you think that collaboration with another culture is necessary in professional life?

Yes ☐ No ☐

Why?.....

23. If other group members were Turkish.....

.....

15. Overall evaluation of collaboration with another discipline

|             |                          |                          |                          |                          |                          |                 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------|
|             | 5                        | 4                        | 3                        | 2                        | 1                        |                 |
| Easy        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Difficult       |
| Flexible    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Rigid           |
| Quick       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Time- consuming |
| Informative | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Uninformative   |
| Clear       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Confusing       |

16. Overall evaluation of collaboration with another culture

|             |                          |                          |                          |                          |                          |                 |
|-------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|-----------------|
|             | 5                        | 4                        | 3                        | 2                        | 1                        |                 |
| Easy        | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Difficult       |
| Flexible    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Rigid           |
| Quick       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Time- consuming |
| Informative | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Uninformative   |
| Clear       | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | Confusing       |

17. What are the strongest points of collaboration with architecture?

.....

18. What are the weakest points of collaboration with architecture?

.....

19. What are the strongest points of collaboration with members of another culture?

.....

20. What are the weakest points of collaboration with members of another culture?

.....

| In collaboration with architecture students...  | always                   | frequently               | sometimes                | rarely                   | never                    |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | 5                        | 4                        | 3                        | 2                        | 1                        |
| incompability of vocabularies was a problem.    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| difference in working discipline was a problem. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| approach to design problems was a problem.      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| incompability of design tools was a problem.    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| they were dominant when deciding a solution.    | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| task distribution was equal                     | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| using different media was a problem.            | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

| In collaboration with Dutch students...                         | always                   | frequently               | sometimes                | rarely                   | never                    |
|---|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
|   | 5                        | 4                        | 3                        | 2                        | 1                        |
|   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| using different language was a problem.                         | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| difference in working discipline was a problem.                 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| approach to design problems was a problem.                      | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| people were the same despite outward differences in appearance. | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| they do not have the same values and goals as Dutch students.   | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

## **APPENDIX B**

### **B.1. IAED 316 Computer Applications Fall 2003-2004 Project Brief**

#### **Re-building Part of ‘Your Building’**

This project deals with re-building one of the following interior spaces of the FADA building of Bilkent University. You will choose one of the following interior spaces and convert it into an exhibition space for student projects.

Entrance Hall of the FFA wing of FADA building  
Entrance Hall of the FFB wing of FADA building

You are required to transform the space by adding exhibition units, lighting fixtures, walls and panels so that student works at the end of the semester can be exhibited here. Do not forget that student works comprise drawings, posters and models.

#### **Phase I – Designing the Space**

You will form groups of 4 people to work together on the project for the rest of the semester. First, you will photograph the selected space within the building and scan these photographs. You will then be presented with software packages that will aid you in designing the space.

At the end of this phase, you will be required to present your design, using all or some of the software packages you have been introduced with. You are required to prepare a sound enhanced animation showing the experience within the space when the user enters. The choice of the music piece is up to you. The animation should show how the space looks like when there is an exhibition.

#### **Phase II – Presenting the Design**

At this phase, you will work on making a web site for your design. You will be introduced with relevant software for this phase. The web site should include drawings, photo-realistic presentations, animations and written information about the design.

#### **Evaluation**

Your project will be evaluated with pre-juries and a final jury, based on the following criteria (yet, not necessarily in this order):

- success in selecting the relevant computer software that suit your intentions
- your skills in using the computer tool(s) creatively and effectively
- the development of the interior space and its elements
- the success of the animation in revealing the space and its relation to the music piece
- the success of the web site in giving information about the design in a clear, direct, yet exciting composition

*The calendar, syllabus and evaluation percentages for this course is accessible on the Internet.*

## B.2. IAED 316 Computer Applications Fall 2004-2005 Project Brief

09 September 2004



### Turkish Stores in the Netherlands

This elective course is a collaborative project between the Department of Interior Architecture and Environmental Design at Bilkent University, (Ankara, Turkey) and the Faculty of Architecture in Technical University of Delft (The Netherlands).

The purpose of this study is to engage in cross-cultural design collaboration of undergraduate students in Turkey and the Netherlands. In this study, the students from two sides will work together to design a Turkish store in the Netherlands. Three students from TUDelft and two students from Bilkent will compose a group. The store may be selling any product you select, from clothes to Turkish delights. This study will last for about 7 weeks; on 9th week there will be a final presentation with Bilkent students.

TUDelft students will choose a place for store and take two short video films. The first video project will include two short videos: one still images in a sequence, and another one moving images. The second video project will be composed of moving images; also using sound will enrich videos. Bilkent students expect from the first video project to:

- demonstrate Turkish stores in the Netherlands, give an idea about Turks in the Netherlands, (Still images with sound)
- describe program brief and client profile, demonstrate the built environment. (Moving images with sound)

After the first video, Bilkent students will choose one project and join the group. Group will work together to develop a concept and a program for the store. Bilkent students react to videos with architectural drawings, posters, flash animations and 3D images.

The second video should

- develop an architectural view,
- give clues about materials, lighting, atmosphere,
- give clues about form and boundaries of space
- give clues about structure
- support the concept

After 9 weeks Bilkent students will take over the project and develop it further.

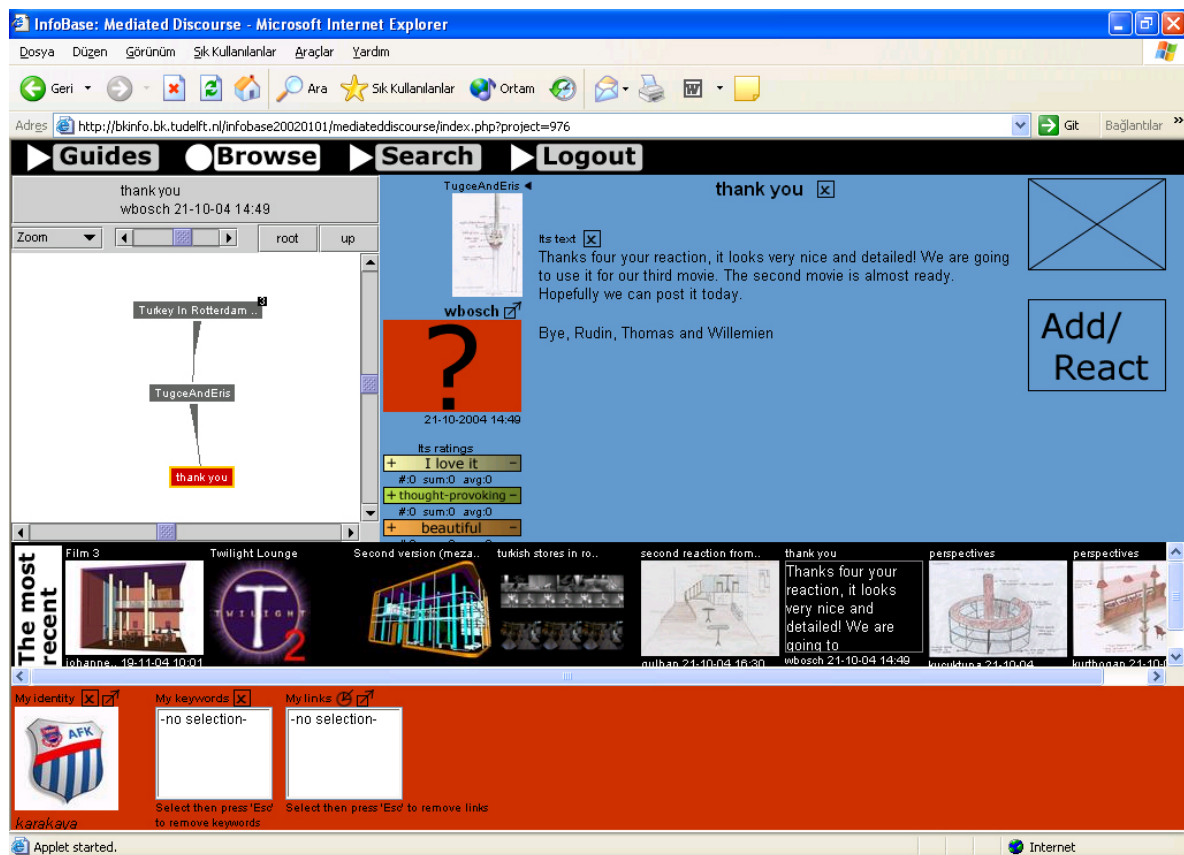
In order to handle the collaboration, the InfoBase will be utilized. You will use the InfoBase to exchange, manage and store information that your group collects and generates. For synchronous communication, you will use a mailing list, a weblog and Microsoft MSN Messenger.

The similarities of disciplines and the differences in social and cultural contexts provide a rich setting for exploring cross-cultural design collaboration and understanding of interdisciplinary spatial processes. In addition, the collaborative experience will provide an opportunity for critical reflection on the culture-space relationship.

## Appendix C

### C.1. Examples of InfoBase Communication

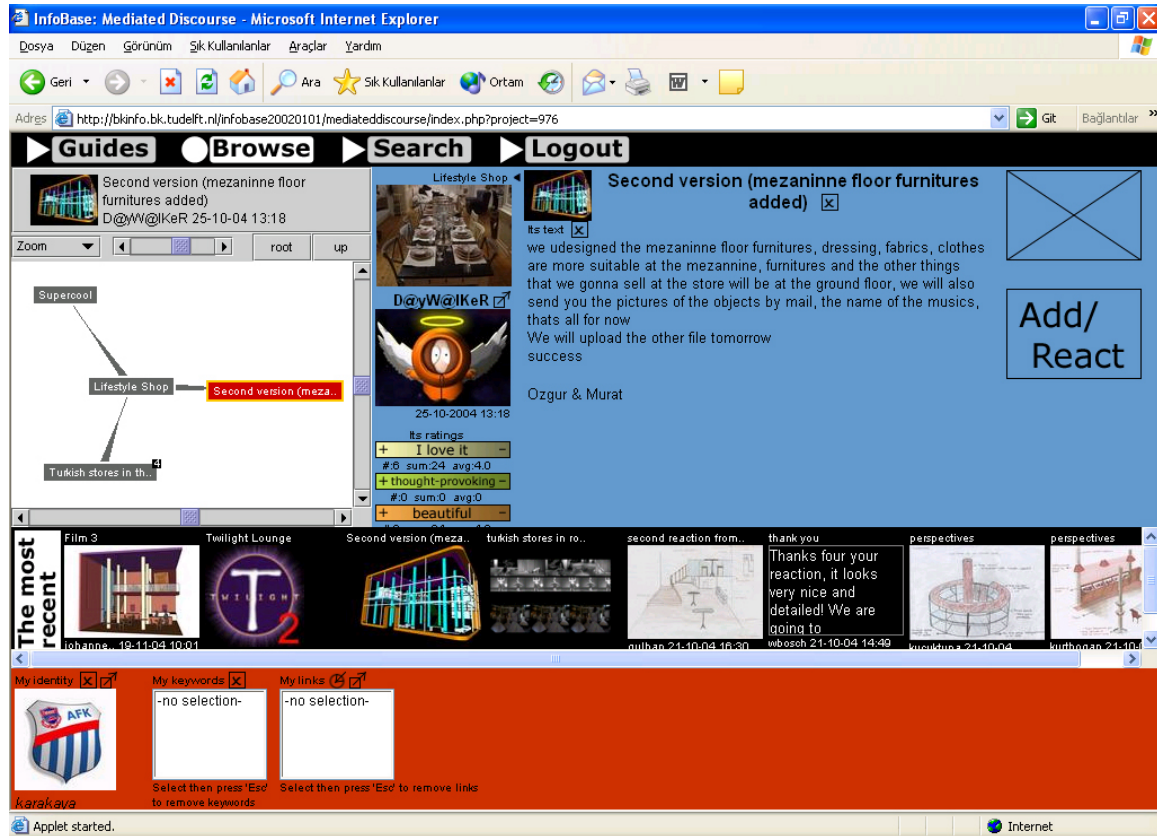
#### C.1.1. An Example for InfoBase Communication (student group 2, from TUDelft to Bilkent)



## C.1.2. An Example for InfoBase Communication (student group 5, from Bilkent to TUDelft)

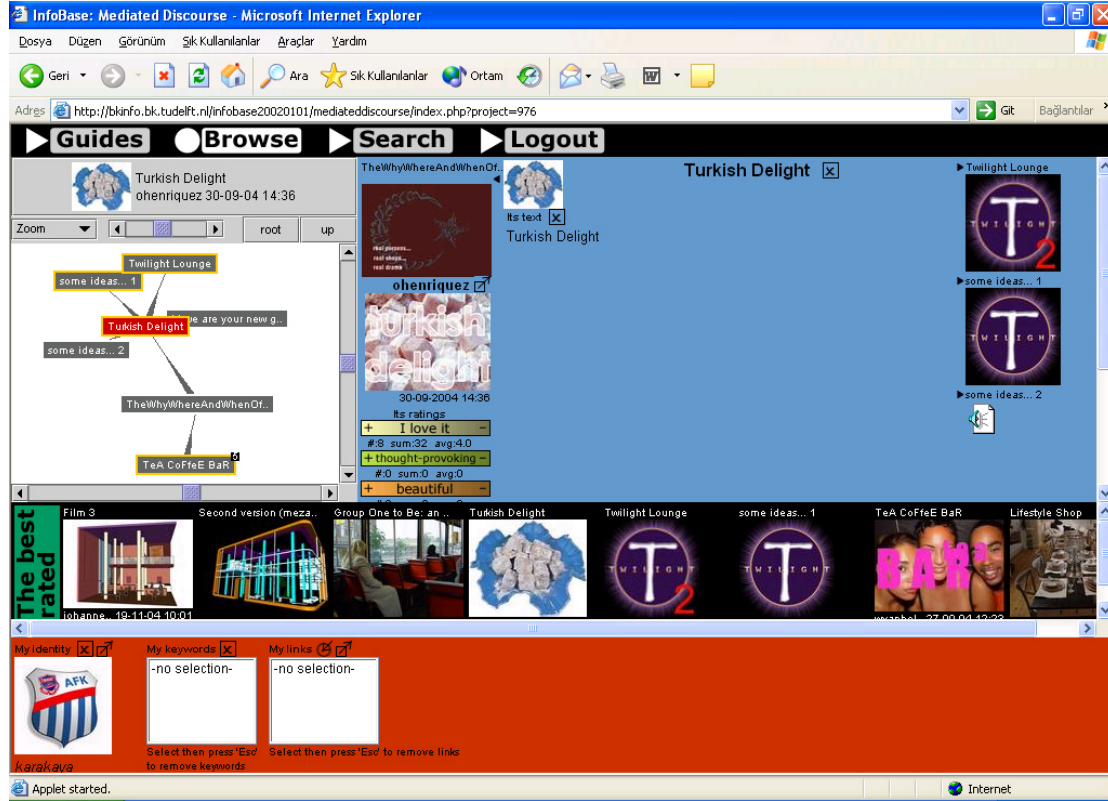
The screenshot shows the 'InfoBase: Mediated Discourse' web application running in Microsoft Internet Explorer. The browser's address bar displays the URL: <http://bkinfo.bk.tudelft.nl/infobase20020101/mediateddiscourse/index.php?project=976>. The application interface includes a navigation bar with 'Guides', 'Browse', 'Search', and 'Logout' buttons. The main content area is titled 'hi! how are you? (from gulhan&ece)' and shows a conversation thread. A user named 'karakaya' has posted a message with a rating of 'I love it' and a comment: 'we watch your film different turkish shops and we like it, it explains your hometown very well. but our project we have to understand it better. because of these can you please record the film more slowly with more detailed? ( ex: people prototype, needs...) and also could you please pay more attention to the light because it is reflect so much... thanks for your help and see you later...'. The interface also features a 'Zoom' control, a 'root' button, and a 'SULTAN'S NEW FILM' section. At the bottom, there are sections for 'My identity', 'My keywords', and 'My links', each with a selection box and instructions. The status bar at the bottom indicates 'Applet started.' and 'Internet'.

### C.1.3. An Example for InfoBase Communication (student group 7, from Bilkent to TUDelft)



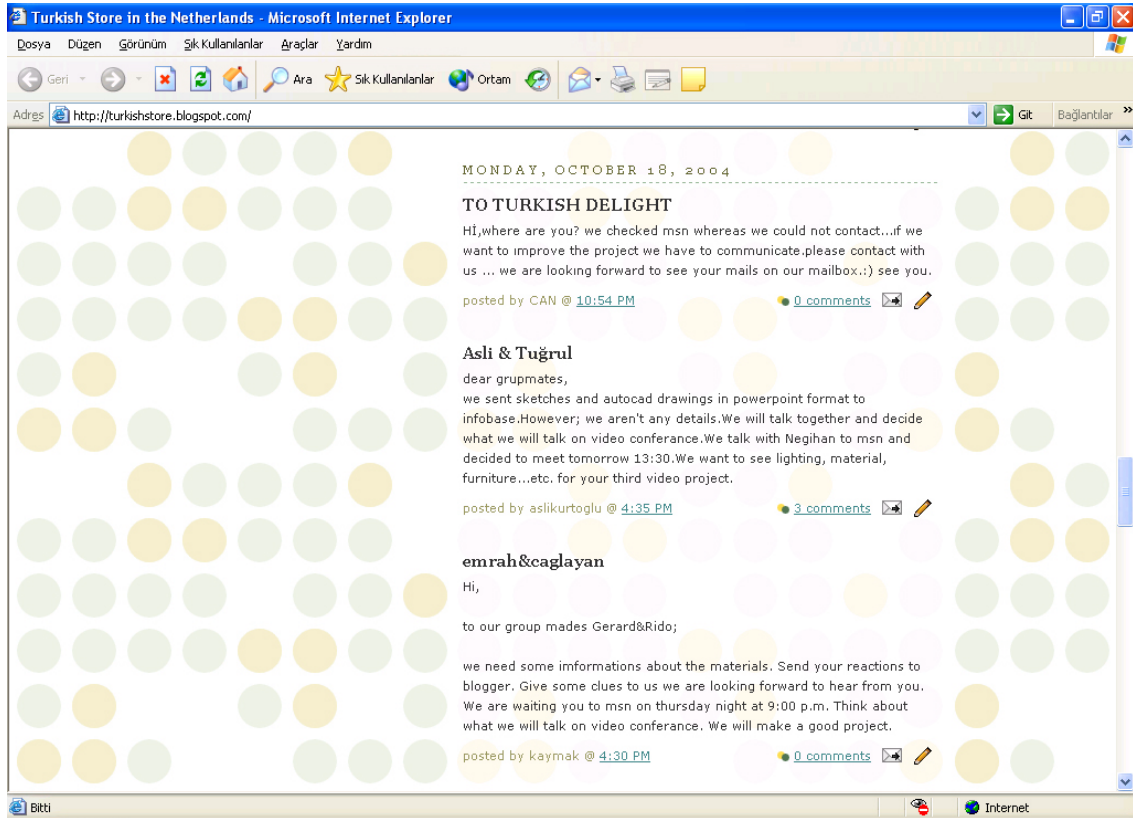


### C.1.4. An Example for InfoBase Communication (student group 8, from TUDelft to Bilkent)

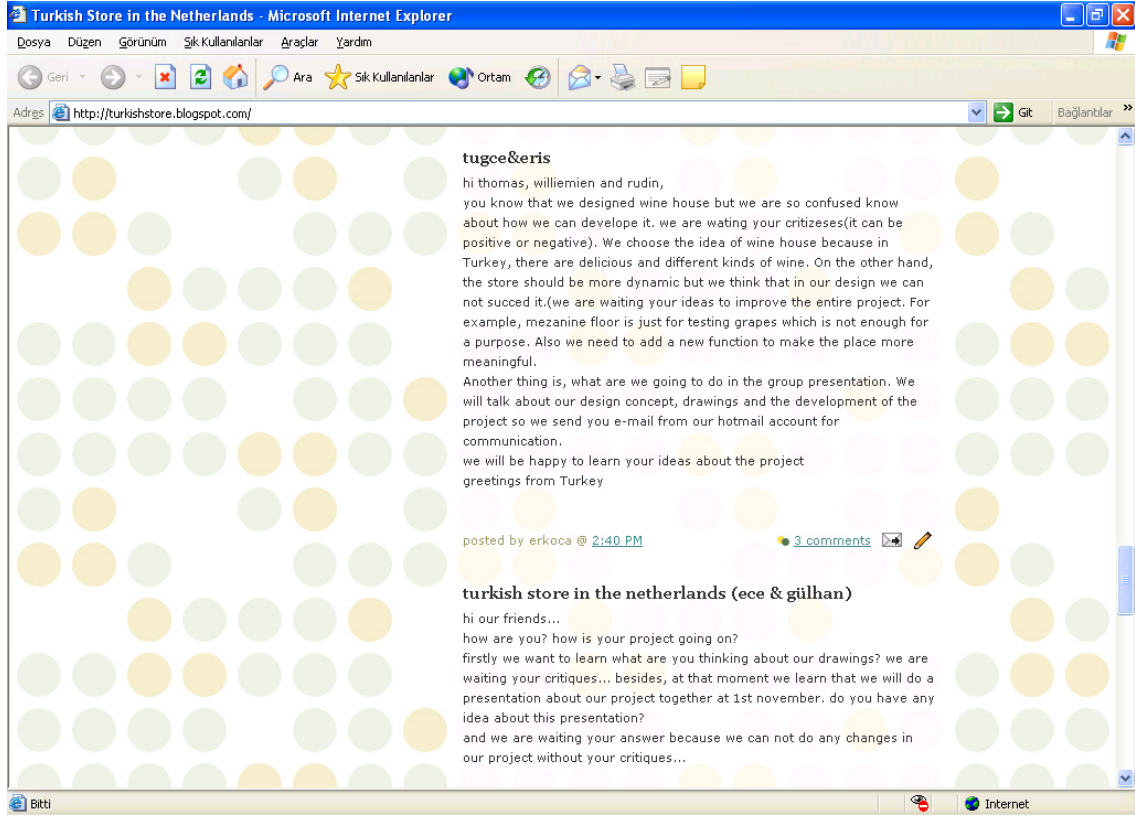


## C.2. Examples of Weblog Communication

### C.2.1. An Example from October 18, 2004



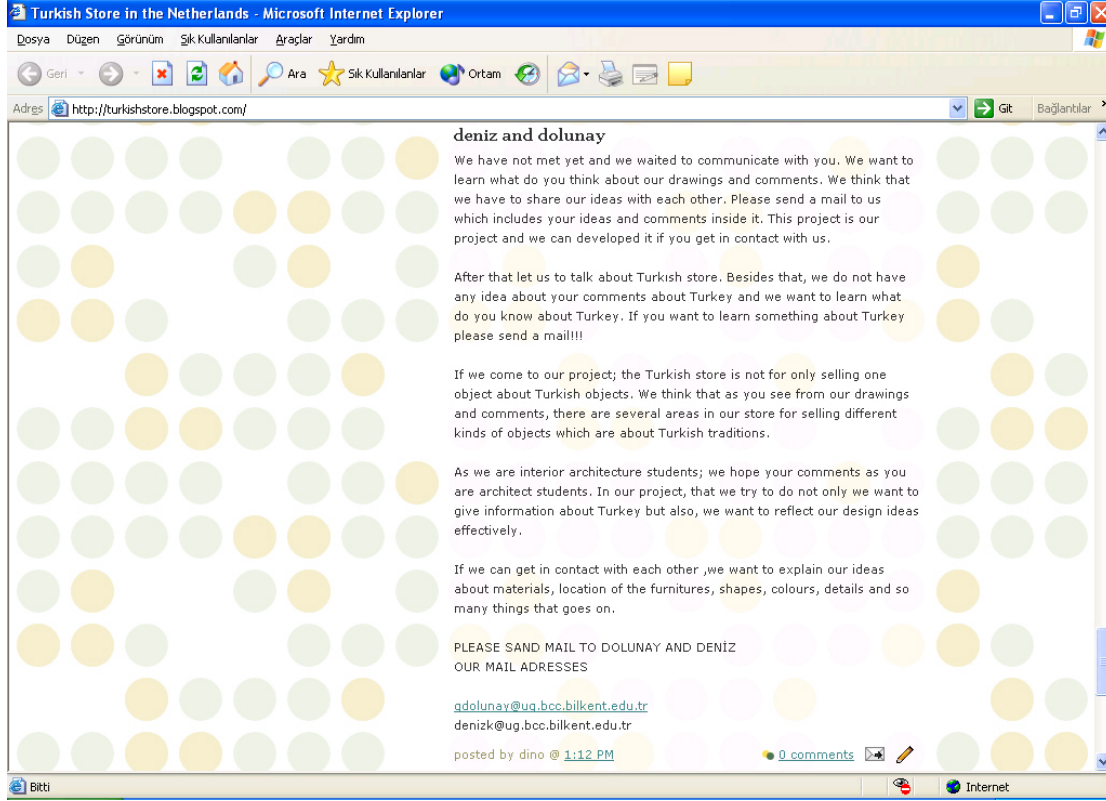
### C.2.1. An Example from October 21, 2004



### C.2.1. An Example from October 21, 2004



## C.2.1. An Example from November 7, 2004



## **APPENDIX D**

### **D.1. Photos from TUDelft**

#### **D.1.1. Computer Laboratory of BK6810 from TUDelft, the Netherlands**





**D.1.2. Architecture Students of BK6810 from TUDelft, the Netherlands  
(student group 3)**



**D.1.3. Architecture Students of BK6810 from TUDelft, the Netherlands  
(student group 7)**





## **D.2. Photos from Bilkent**

### **D.2.1. Interior Architecture Students of IAED 316 from Bilkent, Turkey (student group 5)**



**D.2.1. Interior Architecture Students of IAED 316 from Bilkent, Turkey  
(student group 2)**



**D.2.1. Interior Architecture Students and Instructor of IAED 316 from Bilkent, Turkey**

