ANALYZING THE EFFECTS OF DIFFERENT CRITIQUE TECHNIQUES ON THE SUCCESS OF INTERIOR ARCHITECTURE STUDENTS

A Master's Thesis

by

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July 2015

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

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ABSTRACT

ANALYZING THE EFFECTS OF DIFFERENT CRITIQUE TECHNIQUES ON THE SUCCESS OF INTERIOR ARCHITECTURE STUDENTS

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This study presents the design education literature in terms of design studio learning by reviewing teaching styles, learning models and learning process. Additionally, the term critique is defined as a backbone of the learning process in design studios. The study focuses on three-critique techniques that are desk critiques, pin-up critiques and group critiques.

The purpose of this study is to analyze the effects of different critique techniques on the success of interior architecture students. It also explores correlations between student attitudes toward each critique technique and its contribution to the design process. A research was conducted with 3rd year interior architecture students in 2014- 2015 Fall Semester at Bilkent University. It was found that there was not a statistically significant

relationship between student attitudes towards group, pin-up critiques and their final performance scores; however, there is a statistically significant relationship between student attitude toward desk critique and their final performance scores. Furthermore, the contribution of a critique technique to design process is highly correlated with student preference for this critique technique.

Keywords: architectural design education, design studios, critique techniques, desk critique, pin-up critique, group critique

ÖZET

FARKLI KRİTİK TİPLERİNİN
İÇ MİMARLIK ÖĞRENCİLERİNİN BAŞARISI ÜZERİNE
ETKİSİNİN ANALİZ EDİLMESİ

Günday, Çiler Gözde

Yüksek Lisans, İç Mimarlık ve Çevre Tasarımı Bölümü

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Bu çalışma, tasarım eğitim literatürünü birer öğrenme ortamı olan tasarım stüdyolarını öğretme stilleri, öğrenme modelleri ve öğrenme süreci açısından incelemiştir. Ek olarak, tasarım stüdyolarında kritik teriminin, öğrenme sürecinin belkemiği olduğu tanımlanmıştır. Bu çalışma, üç kritik tipine odaklanmıştır: masa başı kritikleri, ara dönem kritikleri (pin-up), grup kritikleri.

Bu tez, farklı kritik tiplerinin iç mimarlık öğrencilerinin başarısı üzerine etkisinin analiz edilmesini amaçlamıştır. Ek olarak bu tez, öğrencilerin kritik tiplerine olan tutumlarıyla, bu kritik tiplerinin tasarım sürecine etkisinin korelasyonunu incelemektedir. Bu

araştırma Bilkent Üniversitesi 3. sınıf İç Mimarlık öğrencileriyle 2014- 2015 akademik güz döneminde yürütülmüştür. Araştırma sonucunda, öğrencilerin grup ve ara dönem kritiklerine karşı tutumlarıyla final notları arasında istatistiksel olarak bir ilişki saptanamamıştır; ama öğrencilerin masa başı kritiğe olan tutumlarıyla final notları arasında istatistiksel olarak bir ilişki saptanmıştır. Buna ek olarak, kritik tekniğinin tasarım sürecine katkısıyla öğrencilerin bu kritik tekniğini tercih etmeleri arasında yüksek bir korelasyon vardır.

Anahtar Sözcükler: mimari tasarım eğitimi, tasarım stüdyoları, kritik tekniği, masa başı kritik, ara dönem kritik, grup kritik

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CHAPTER I

INTRODUCTION

1.1. Definition of the Problem

Architecture design education is based on studio education and gaining fundamental knowledge on practical, social, cultural and technical subjects along studio education (Afacan, 2012). In the architectural design education, design studios are assumed as the core of the curriculum (Demirbaş, & Demirkan, 2003). In design studio, students are provided with the environment, where they gain knowledge and practice in their projects. According to Sagun, Demirkan and Göktepe (2001) design studios are defined as an environment that is different from a traditional classroom from pedagogical, sociological, ideological and epistemological points of view. Hence, the design studios can be handled in the view of developmental psychology of learning styles and "importance of design education, its' problems, relations and contents at sociological level and its relation to other disciplines at epistemological level" (Demirkan, & Demirbaş, 2003, p. 438). In the design studio, students can combine all the information that they have learnt in other courses. In other words, unlike a lecture course, students learn by applying the information to the studio projects and learn by doing in the design studios (Schön, 1987).

From this point of view, Shuell (1986) identified learning "as an enduring change in behavior or in the capacity to behave in a given fashion that result from practice or other forms of experience" (p.412). There are many different theories about how people learn. Burns (1995) conceives "learning as a relatively permanent change in behavior with behavior including both observable activity, and internal process such as thinking, attitudes and emotions" (p.66). According to Dunn (2002), there are six learning theories in design educational context, which are sensory stimulation theory, reinforcement theory, cognitive-Gestalt theory, holistic learning theory, facilitation theory, and experiential learning theory (2002, p.1).

Even there are theories of learning in the educational context; in design studios, there are two ways to use information learnt. The first one occurs through applying the information to the design studio project. The second one occurs in practicing. During this practice, design studio students initiate to learn by doing. Learning by doing is reviewed as experiential learning in literature (Schön, 1987). Kolb (1984) introduced experiential learning model and supposed that knowledge is gained through personal experiences (p.21). The experiences occur when students are individual while applying their knowledge to their design projects.

Nevertheless, students need to take feedbacks to apply their knowledge and being involved in their own design process. At this point, what is a critique and how is it conducted gain importance. In design studios, the critique process constitutes the backbone of the educational process. The literature defines critique as a tool of education in design studio. In other words, in a design studio for communication of

ideas and learning process, critique is a primitive step. For these reasons, critique techniques will be analyzed by exploring their effects to the success of the Interior Architecture students.

Briefly, design studios are the learning environments in architectural education and critique has an important role for transforming the design ideas. Additionally, each student's way of understanding of critiques and her/his attitudes toward different critique techniques, what s/he has experienced from the critique and how different critique techniques affects her/his success become key questions for design studios. However, there is a lack of information in literature in terms of critique types influences on student attitudes, experiences and success.

Thus, this thesis aims to find whether there are any statistical relationship between student attitudes toward different critique techniques and their final performance scores. It also explores statistical correlations between student attitudes toward desk, group and pin-up critique and their preferences.

1.2. Thesis Objectives

The main objective of this thesis is to analyze interior architecture students' attitudes, satisfaction degrees and experiences toward desk, pin-up and group critiques. The followings are the sub- objectives:

1. Identifying the effects of different critique techniques on the success of interior architecture students
2. Analyzing the relationship between student attitudes toward desk critique, pin- up critique and group critique
3. Identifying correlations between student attitudes toward critique techniques and contribution of these critique techniques to the design process
4. Analyzing statistical relationships between students' attitudes on different critique techniques and the final performance scores
5. Synthesizing literature review and case study statistical results based on student categorization and their preferences, learning experiences and satisfaction degrees
6. Suggesting further research on the related topic

1.3. Structure of the Thesis

This part provides an overview about each chapter. The second chapter, Literature Review, explores the literature on architectural design education, design studios, Schön's (1985) philosophy of design and design education is mentioned in this chapter. Design Studio are explained in detail. Teaching styles and learning models are elaborated. Goldschmidt's et al. (2010) categorization for the relationship between student and instructor is defined. Furthermore in this section, Schunk's (1996) criteria' is explained. In addition to the learning criteria, the history of a design critique and different critique techniques are presented. In the third chapter, Case Study, first methodology of the study, then research questions and hypotheses are presented. Finally, sample group and procedure are explained.

In the fourth chapter, the results of the case study are discussed based on the literature review. First, descriptive data of the sample group is presented in descriptive statics part. Then, each critique technique is analyzed separately in terms of its correlations to student attitudes, preferences and success. The differences between student categories are discussed in terms of student attitudes toward each critique technique. The quotations obtained from students' informal talks are also discussed. Briefly, the results of hypotheses, research questions and statistical findings (descriptive analysis, correlations, t-test results) findings are mentioned in this part.

The fifth chapter is conclusion of the study. Suggestions for further research are expressed in this chapter. References are stated in the following chapter.

CHAPTER II

LITERATURE REVIEW

2.1. Architectural Design Education

"Architecture is a multidisciplinary field that is a part of arts, sciences and social sciences" (Nicole, & Pilling, 2000, p.5). In architectural design education, the most significant part in the curriculum is design studios where students learn how to design. In design studios, students are expected to bring the knowledge from different disciplines to create design projects (Nicol, & Pilling, 2000).

According to Teymur (1992), the architecture department is considered as a part of arts, social and environmental studies, engineering in the academic consideration. Demirbaş (2001) defines architecture as a field of design or construction. According to Duffy (1995), it is better to define architecture as both professional practice and construction, because of the fact that the education of architecture is directly related with the professional practice.

On the other hand, Uluoğlu (1990) provides a general overview regarding the architectural design education. According to this overview, there are some courses that (1) develop the architectural formation, (2) present specific formation, (3) highlight strength of architectural design and expression and (4) teach all aspect of designing (Uluoğlu, 1990). Table 1 presents these courses related to the architectural design education.

Table 1. Architectural design education categorization (Uluoğlu, 1990, Demirbaş, 2001)

Categorization in architectural education	***Contextual Aspect***	***Examples***
Architectural formation	Theoretical knowledge	History of Art Built Environment and Furniture Human Aspect of Design Real life based courses (such as Professional Practice, Design Documentation)
Scientific formation	Theoretical and practice based	Construction, Structure, Control of Physical Environment, Building Physics
Strength architectural design and expression	Practice based	Technical Drawing, Freehand Drawings, Perspective, Building Programming and Model making
Design courses	Theoretical and practice based	Design Studios, Detailing Studio and Computer Aided Design

Architectural design education that consists of studio teaching and project designing is the matter of synthesizing, evaluating, and presenting ideas regarding the solutions to common design problems (Afacan, 2012). In addition to this, architectural design education is also a context, which places an important emphasis on the oral communication proficiency (Dannels, 2005). According to Anthony (1991), oral communication assignments are the primary method in design studios, through which the performance of students is evaluated. The oral communication that is defined as critique has an important role in the architectural design education especially in design studios in terms of student performance.

However, before emphasizing the current terminology of architectural design education, the developments should be mentioned from past to present. In this respect, architectural design education is also defined as constructing and structuring creative opinions, thoughts, designing products through time with a definite addition of knowledge (Kahvecioğlu, 2007). According to Yürekli (2007), architecture is an academic field of study and research and architectural design education is durable by intellectual interest, energy and consciousness.

There are different kinds of definitive characteristics of architectural design education. Nevertheless, most of them point out the purpose of architectural education. Reviewing the literature shows that there are several aims of architectural design education. Kahvecioğlu (2001) states the aims of architectural design education: (1) to provide students with different design experiences, (2) to guide in taking an active role, (3) to take risks in different fields of disciplines, (4) to share the

knowledge, exchange and developments and (5) to express different cognitive approaches and scholar superiorities. According to these aims, in design studios, students have chance to deal with real design problems, which makes student practice architecturally. Moreover, each student also attends actively and get involved in the design process. Thus, design education provides students and instructors an interactive learning environment, where students share their knowledge and become part of the process. By interactive learning environments, it is meant that design education environment provides communication and motivation within the studio environment.

In the literature of architectural design education, Schön (1930-1997) is assumed as the influential theoretician of design and design education (Waks, 2001). Schön (1983) realized the rapid change in technology that threats people's individual and social identities. Schön (1983) also determined how generative metaphors consents people to build meaning in their consistently altering circumstances, combining older experiences to present through pointing similarities between them (Waks, 2001). These generative metaphors authorize people to take the familiar to tolerate in the unfamiliar in order to come out new concepts through preserving as well as of the old (Schön, 1963).

Schön (1983) also introduce to the concept of 'reflective practice'. Many education departments initiate improvements of their curriculums based on this theory. According to Schön (1983), reflective practice is a kind of ability that reflects on action occurring in the process of sustained learning. Subsequently, "the university

had become the epistemological center of practice and training ground for all practitioners" (Waks, 2001, p.39).

In the literature, there is some criticism on concept of ' reflective practice'. Kotzee (2012) points out the criticism in his work of 'private practice' and explores the missing social scope on 'reflective practice'. "Reflective practice is too individualistic in its conception of learning and that it leaves out the 'social dimension' of learning" (Kotzee, 2012, p.6). According to Kotzee (2012), Schöns' ideates practice as a kind of individualistic fashion.

Beside to Schön's philosophy, the retrospect of architectural design education has been gained an importance for understanding current architectural design education. At this point, Uluoğlu (1990) provides the information about the development of architectural design education. According to Uluoğlu (1990), in the first stage, there were no schools and professions were the masters. Then design theory was initiated to give some schools, however practice of design was missed. Nevertheless, with the need of both design theory and practice, the concept of design studio has begun, where theory and practice has met in an educational environment. Through this perspective, it can be said that design studios are the learning environments in architectural design education, which involves both theory and practice. As stated previously, both theoretical and practical aspects of design education have been developed through the oral communication.

2.2. What is a Design Studio?

The significant part of architectural design education takes place in design studios (Chaikin, 1998). Altay (2014) supposed that architectural and interior design education depend on design studios in which students meet with a design problem and solve this problem during the semester. According to Sagun (2003), design studios are the settings where students create projects; learn to improve their skills associated with projects. "In conventional design studio, students mostly work on the design brief individually and learn the design process as an individual activity" (Sagun, 2003, p.39). According to Cuff (1991), design studio is a educational setting like not solely working place, but also as an arrangement of home and working place like "contemporary concept of home office" (p. 219). This is because, architecture students spend their most of the time in design studios and they should perceive the design studio where they may study both during and after the class hours (Gur, 2010).

In traditional design studios, learning and teaching design occur in individual working settings like a drawing desk and each student has his or her own drawing desk (Sagun, 2003). Students and instructors meet and interact face to face in these settings to discuss projects. In some cases, there might be more than one student and each student have chance to get involved with each other's teaching and learning process. "Although discussions are held among students, design is explored as an individual activity" (Sagun, 2003, p.37). The alternative solutions for design projects are taking place in design studios. The participation of students in design studio occurs while they are introducing their own solutions for same design problem. In

that sense, students may have chance to observe, analyze and discuss each other's design projects (Sagun, 2003). Design studios are ordered through associating with the assets and activities occurring in the studio (Sagun, 2003).

2.3. Learning Process in Design Studio

In the literature, there is not only one description of learning. However, Schunk (1996) provides three criteria that help to define a learning model (Table 2). The first criterion is that one can learn when s/he becomes able of performing something differently. According to this, "learning is based on what people say, write and do" (Schunk, 1996, p.4). The second criterion supports that something that is learnt may not be remembered by people due to some factors like fatigue, alcohol etc (Schunk, 1996). The third criterion is about learning by doing. Schunk (1996) supports that learning can occur through practice, observation and experiences.

Table 2. Criteria of learning (Adapted from Schunk, 1996, p.4)

Three criteria	*Definition*
Learning involves change	Learning is based on what people say, write and do
Learning endures overtime	Learning may not last forever because forgetting occurs
Learning occurs through experience	Like practice, observation of others

Schunk (1996) also mentions a learning research paradigm, which involves correlation to examine relation between variables, experimental research when one or more variables are altered, a qualitative research in the case of description of events,

laboratory for projects could be conducted in a controlled settings and finally the field survey when projects are conducted in a natural setting (Table 3).

Table 3. Learning research paradigm (Adapted from Schunk, 1996, p.11)

Methods	***Definitions***
Correlation	Examines relations between variables
Experimental	One or more variables are changed
Qualitative	Concerned with description of events
Laboratory	Project conducted in a controlled setting
Field	Projects conducted a natural setting

In addition to Schunks' criterion, Kelly (1997) negotiates the learning, which is created by Saljo (1979). According to Kelly (1997), Saljo claims learning as an activity and came up with a cascade list of learning. As far as Saljo (1979) is concerned, (i) learning enhances knowledge, (ii) learning is memorizing, (iii) learning is improving abilities and techniques, also gaining facts, which may be utilized as needed, (iv) learning is regarded as having merit of information, distilling the meaning and combining the information to daily life, (v) learning is related to accepting the world through reinterpreting knowledge. Depending on this classification, whereas first third step is more external, last two steps are internal. In other words, through depending on last two-step of this classification, learning is a process that depends on the experimentation. Briefly, people agree that learning is

significant; however, they have varied sights on the stages and results of learning (Schunk, 1996).

Besides the definition of learning and classification about learning, how learning process is defined in design studio is also significant. "Design studio is characterized by a teaching model that is distinctly suited for problem- solving" (Maturana, 2014). According to Ledewitz (1985), there are three aspects of design education in terms of teaching: (i) learning and practice, (ii) learning new language, (iii) learning thinking architecturally. Firstly, in design studios, students learn and practice a number of new skills. Secondly, students learn a new language in design studio as well (1985). At this point Ledewitz (1985) mentions Schön's (1992) description of design 'graphic and verbal language game', in which drawing and talking are supplementary and intimately linked. As a third aspect, Ledewitz (1985) supports that "in design studio, students learn 'thinking architecturally' referring to 'particular domain of problems and solutions that characterize, and are fundamental to professional performance" (p.2).

The educational process in design studio involves not solely teach all three aspects but also learning them at the same time (Ledewitz, 1985). To illustrate, drawing is a tool for communicating 'spatial concepts'. In addition to Ledewitz (1985) narrative of design studio, Demirbaş and Demirkan (2003) support that organization of essential knowledge and representation of this knowledge is significant issues in design studios. Sagun (2003) claims that the process in the design studio occurs with identifying design brief and introducing the design problem as well as introducing

the qualifications of the problem set. At this point, students explore the current problem through discussions. The expectations are drawn clearly and throughout the semester student and instructor comes together through informal and formal meetings (Sagun, 2003).

The learning process in design studio also involves teaching how to design architecturally, including the progress of students' creativity and their critical thinking on design problems (Spridonidis, & Voyatzaki, 1998). Designing aspects come along with the term of design knowledge in the literature. "The content of design knowledge is based on the design process" (Sagun, 2003, p.46). Uluoğlu (2000) described the process of design knowledge under four headings: categories, structuring, representation and content.

According to Sagun (2003), the knowledge category occurs in the process of conceptualization. Act of structuring knowledge occurs through analysis of design development and pointing the strong and weak aspects of students' projects. The third one, representation is knowledge in which reflective knowledge, operative knowledge, contemplative knowledge, directive knowledge, associative knowledge and other informal communication issues are mentioned (Table 4). According to reflective knowledge, interpretations and descriptions are stated whereas in the operative knowledge, coaching and demonstrations are stated (Sagun, 2003). Contemplative knowledge involves questions, reminders and problem statements whereas directive knowledge includes completions, conflictions, positive and negative statements (Sagun, 2003). The final representation of knowledge, associative knowledge involves examples, analogues and scenarios (Sagun, 2003).

The last category, content occurs through the conceptual structure and depends on quantitative and qualitative characteristics (Sagun, 2003). What it means is that quantitative knowledge occurs through conceptual developments whereas qualitative part of knowledge occurs through meaning of concept and the relationship between other concepts (Sagun, 2003).

Table 4. Categories of representational forms of knowledge (Adapted from Sagun, 2003, p.46)

Representation of knowledge	***What they involve***
Reflective knowledge	Interpretations and description
Operative knowledge	Coaching and demonstrations
Contemplative knowledge	Questions, reminders and problem statements
Directive knowledge	Completions, conflictions, positive & negative statements
Associative knowledge	Examples, analogies and scenarios

Moreover, According to Uluoğlu (2000), knowledge has two parts: (i) knowledge for being good architect/ designer, (ii) knowledge for being good educator. Uluoğlu (2000) states that being a good architect is not enough for being studio master and teaching design necessitates different skills than designing. In Figure 1, Uluoğlu (2000) provides the process of interaction between instructor (SM) and students (ST).

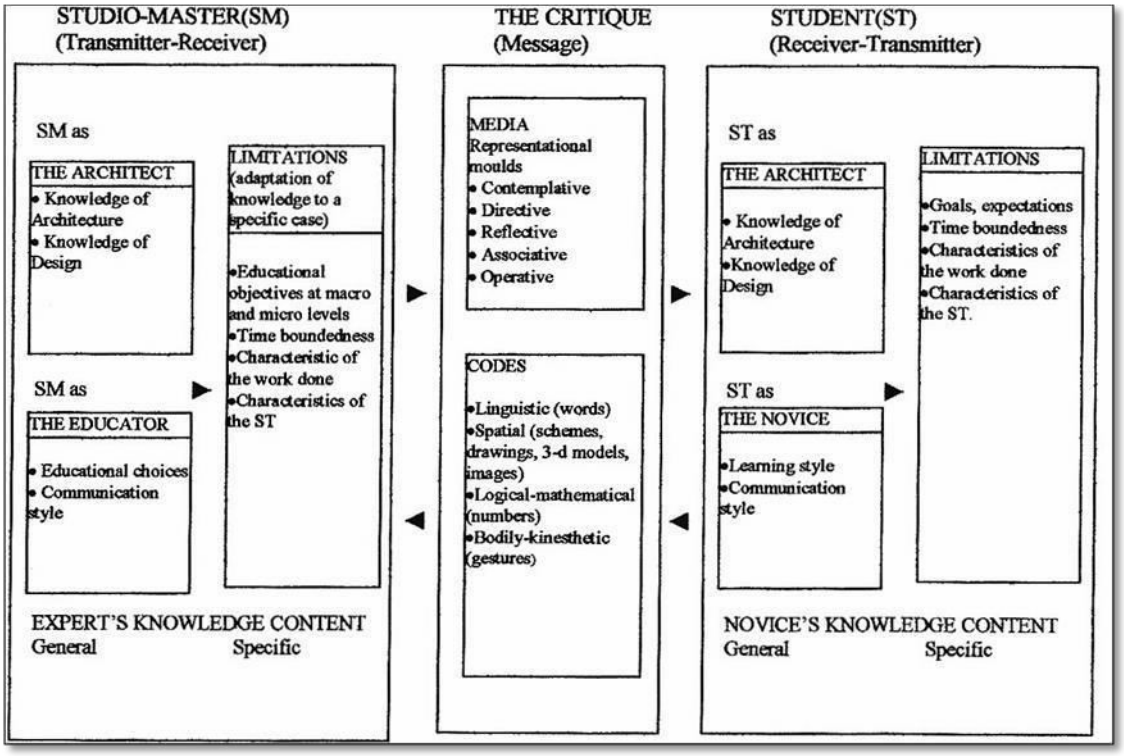

Figure 1. A model for studio master and student interaction in design studio (Uluoğlu, 2000, p.38)

The learning process in design studio does not solely involve teaching Ledewitz's (1985) three aspect and above mentioned categories but also learning them at the same time. To give an example, drawing is a tool for communicating spatial concepts. In addition to Ledewitz's (1985) narrative of design studio, Demirbaş and Demirkan (2003) support that organization of essential knowledge and representation of this knowledge is significant issue in design studios. The learning process in the design studio occurs with identifying design brief and introducing the design problem as well as introducing the qualifications of the problem set. At this point, students explore the current problem through a number of discussions throughout the semester, during which student and instructor come together with informal and

formal meetings (Sagun, 2003). In the next subsection, these discussions are mentioned in detail under the terminology of design critique.

2.3.1. What is a Design Critique?

Critique is "a detailed analysis and assessment of something" ("Critique", 2015). According to Silverman (1992), critique is an action that identifies problems and user based solutions through judgments. Besides the dictionary definition, Ostermann (1998) explains critique as an advice, suggestions and questions regarding the project, which is about individual student presentations on their own project.

Fischer et al. (1998) define critique as a dialog, which enhances the knowledge regarding the design situations. According to Fischer et. al. (1998), the process of critique involves supporting incorporation of design problem identification and solving. It also helps to access related issues in the information space through emphasizing problematical situations and improving arguments related to the design solutions occurs (Fischer et. al., 1998). Schön (1985) describes what design knowledge is conveyed during a design critique session using the concept of 'repertoire', which is a collection of descriptions, thoughts, actions and illustration.

Schön (1983) conceptualizes the design critique as reflective and communicative coactions with the material and object of a design situation. The process of interaction occurs between students and instructors and this process is called as critique in design studio (Dannels, 2005). Schön (1985) called this process as

'reflection in action'. To understand the concept of reflection in action, it is significant to understand how reflection is occurs. Reflection is significant in learning from experiences and allows students to figure out the relationship between theory and practice (Gray, 2001).

According to Schön (1987), during the critique process, there are two ways for interaction: (i) telling and listening and (ii) representation and imitating. By saying telling and listening, the significant point is to mention the necessary precepts to the student (Demirbaş, 2001). According to Demirbaş (2001), design studio and out of studio is similar that means students, who have difficulty in anything in the outer world, may have difficulty in the studio. However, the difference is that student may learn the essential information to conquer the complexities in the studio (Demirbaş, 2001).

The first way for interaction, telling and saying, is not a single way of interaction that is constant and mutual action between studio instructors and students (Demirbaş, 2001). This is mutual and constant, because while instructor tells, student listens and then student initiate to create some solutions for a design problem in design studio and while student tells solutions for his/ her design problems, studio master listens and become listener (Demirbaş, 2001). In the representation and imitating, Demirbaş (2001) supposes that studio master presents components or characteristics of designing to assist student comprehensions through believing "students need to learn and in doing so, attributes to students capacity for imitating" (p. 24). Following this process, students may form the diversification of that action. Observation of that

action is such problems solve and through altering an imitating action, student may find out new clarifications (Demirbaş, 2001).

The design critiquing has always been a hearth of the education and for this reason, firstly students should understand the critiques, and second, critique should conceive a message through the knowledge of studio master (Uluoğlu, 2000). Nevertheless, there are some factors that may affect design critiquing (Oh et al., 2013). In the following subsection, teaching styles are mentioned as a factor of design critiquing.

2.3.2. Teaching Style

Besides the learning process in a design studio, teaching styles should be also mentioned as a factor of this learning environment. "A teaching style may be described as a plan of action, which defines the attitudes of instructor and the learner for the purpose of complete objectives in subject matter and actions" (Ashworth, 1998, p.120). Studio master's role as an instructor may be altered through their instructive choices and communication techniques (Uluoğlu, 2000). All instructors may have different strategies while communicating with students. Some instructors prefer telling whereas others demonstrating and most of them prefer both (Demirbaş, & Demirkan, 2003).

As Uluoğlu (2000) mentions, teaching of design have not a specific way. However, it may alter through the interaction with the design student and instructor. Goldschmidt et. al. (2010) provide categorization of the interaction between instructor and student.

According to Goldschmidt and colleagues (2010), there are three types of interaction that are (1) master and apprentice, (2) user and designer, (3) peer critique between studio instructors and students. Oh et al. (2013) identifies Goldschmidt's, Hochmans', and Dafnis' work (2010) through the categorization of the relationship between student and instructor. The first one is *master and apprentice* relationship, in which instructor play a role of master and students play a role of apprentice (p.309). The second relationship is *user and designer,* in which the instructor become a user, who comments on the project from the user perspective (Dutton, 1991). Moreover, according to Oh et al. (2013), even though it is not possible to eliminate the teachers role as an professional, user- designer relationship provides "a less intimating, more constructive learning environment" (p. 310). The third categorization is *peer critique*, which occurs in the group critique or informal discussions. This enables students to involve more actively in discussion, where collaborative learning environment occurs (Oh et al., 2013). Briefly, the interaction between student and instructor plays an important role during the critique and has different forms depending on instructor or student relationship.

Furthermore, the literature of architectural design education involves a methodological model of critique sessions and some factors that structure critiques. These factors emphasize the design instructors to figure out most beneficial critique techniques. There are two main conditions related with the critiquing. The first critique condition is related with the settings like desk, group or pin-up critiques, communication modalities like speech, drawing or gesture, delivery types like facilitative or directive, and the last one is related with the delivery itself that is about instructors linguistics and modality choices (Oh et. al., 2013 p.76). The second

condition is related with design phases, individual differences, knowledge and experiences, students' responses, design artifact and learning goals (Table 2.3).

According to Oh (2010), there are five steps for instruction during the critique: (1) observation, (2) noticing, (3) identification, (4) sequence and (5) delivery. Observation occurs when instructor listens and observes student design presentation on the model or sketches (Oh, 2010). When instructor perceives a problematic design issue in students work, noticing occurs. Based on this problematic situation, the instructor identifies the issue and its reasons, possible solutions are drawn, and this step is the identification (Oh, 2010). In addition, sequence occurs when instructor arranges where to deliver feedback to the student (Oh, 2010). To illustrate, instructor may prefer to initiate critique through positive aspects of students design. "Finally, instructor delivers the critique" (Oh, 2010, p.56). According to Torrey (2009), in this step, instructors' linguistics and approach gain significance. Briefly, instructor's gestures, facial expressions and the height of voices have an influence on the interaction between instructor and student and affect the critique.

These factors and critiquing methods are significant for instructors to choose the best strategy to give critiques a student. This may be significant to develop a proper and rigorous pedagogy for the design education and to provide a framework for critiquing practice with studio teachers. Figure 2 illustrates these relationships among studio teacher, student and critiquing. Through basing on students learning process and the interaction process between instructors and students, critique techniques in design studio are mentioned in following subsection.

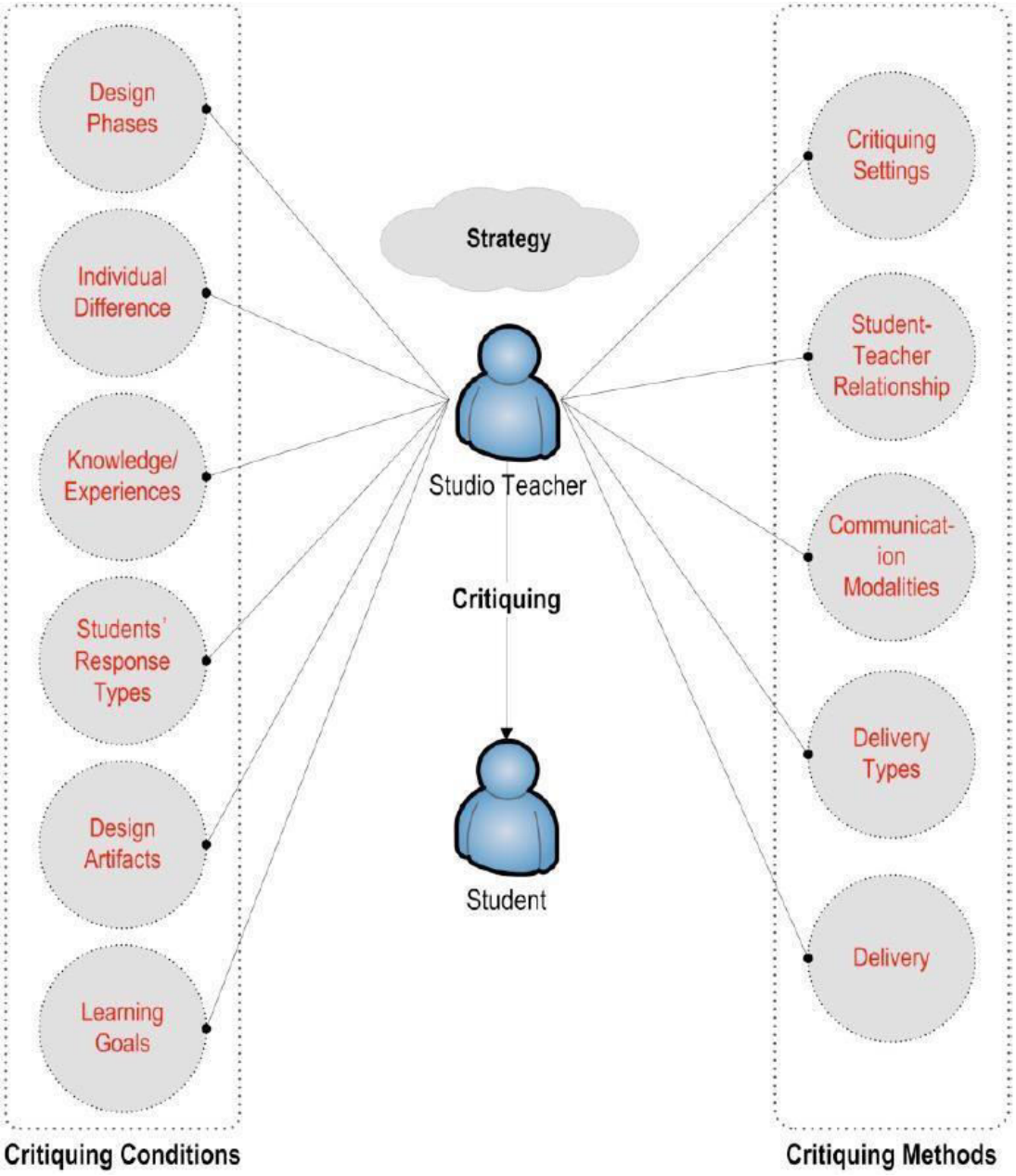

Figure 2. A Framework for Critiquing Practice: Conditions and Methods (Oh et. al., 2013, p.318).

2.3.3. Techniques of Critique Session

In the design studio, student awareness regarding the design situation are improved through critique process by figuring out the challenging conditions (Demirbaş, 2001). Design education researchers mentions several techniques of critique that instructor uses to communicate with students (Oh, 2010). Bailey (2004) comes up with desk critiques, group critiques, interim reviews (pin-up critiques), final reviews and informal interactions. For this study, three of them gain importance that are desk, interim (pin-up) and group critiques. A brief description of these three critique techniques are given in the following subsection.

Before the deepest information regarding the critique techniques, Table 5 illustrates how a critique is categorized. Firstly, a critique technique can be characterized through the number of students. Secondly, it is identified through the range between private and public. Even design studios are open environments, desk critiques are more private compared to group and pin-up critique techniques. However, according to Cuff (1991), design studios are the open spaces and students as expected observe each other's development, comment informally their peers' solutions for design problems, compare design development, and/ or learn certain skills such as drawing and modeling. What it means that it is not extraordinary for students to support from overhearing other students' desk critiques (Oh et. al., 2013).

Table 5. Critique setting considering (i) number of students, (ii) public- private relationship, and (iii) informal formal (Adapted from Oh et al., 2013)

Number of Students	***Critique Techniques***			***Public***
Entire Class		Pin-up and Final Juries		
Small Group	Group Critique			
One by One	Desk Critique			
Informal	←	→	*Formal*	*Private*

2.3.3.1. Desk Critique

"Desk critiques take place throughout the entire semester (typically 12- 16 weeks) of a studio course" (Oh, 2010, p.58). This type of critique provides students with an understanding of the process from the instructor perspective (Oh et. al., 2013). According to Dannels (2005), desk critiques are the oral presentations that are between instructor and a student and are structured as informal. Nevertheless, based on the relationship between students and instructors, students have different abilities to benefit from the critique and develop it as a feedback. Schön (1985) considers desk critique as a significant element of studio teaching. In addition to this, desk critique is the most effective critique technique in design studio, since instructors have chance to see the progress of each student in desk critiques more in detail (Koch et al., 2002). In addition to this, Goldschdmidt (2002) find out how a desk critique provides student and instructor detailed critical design knowledge. Alternatively, Dannels (2005) provides oral genre analysis of critique techniques in design studio by using interviewing and observation techniques. According to Dannels (2005), desk critiques are the most informal of the oral genre in design studios and in desk

critiques, instructors spends significant time for each students. Instructor may work with students one by one and give each students direction (Dannels, 2005). One of the faculty members that Dannels had interview defined desk critique as follows:

> "There is a studio where students spend three days a week and the faculty member assumes the role of the master and goes around from desk to desk, explaining to the students what's right and what's wrong with their work. That is the desk critique" (Dannels, 2005, p.144).

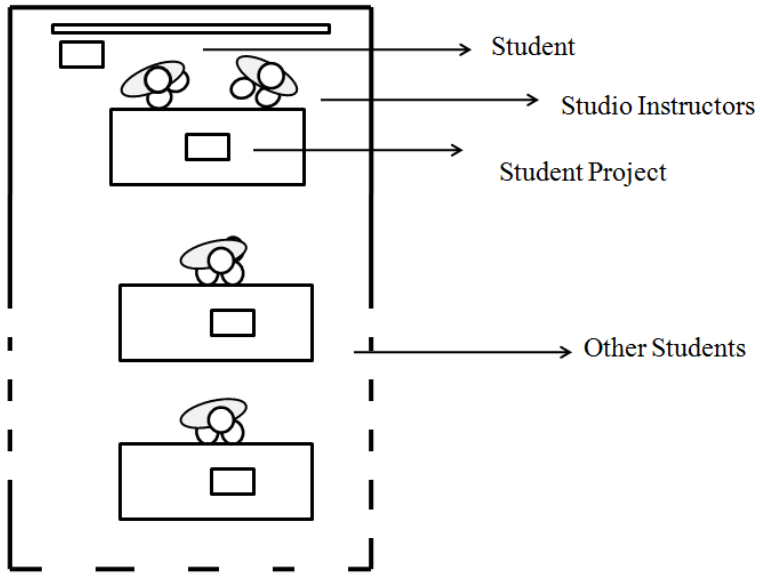

Figure 3. Plan scheme of desk critique (drawn by the author, 2015)

2.3.3.2. Pin-up Critique

In addition to desk critiques, interim (pin-up) gives chance to students to develop the projects (Oh et. al., 2013). According to Dannels (2005), pin-up critiques are the oral representations that students have chance to display their tools on a large wall and get the comments. In some cases, pin-up may be more public and students have chance to get feedback from both instructors and other students (Oh, 2010). In here

students explains what s/he has done and instructor shares the ideas about what they see and perceive (Dannels, 2005). Furthermore, pin-up juries are less informal compared to final juries and the evaluation is not aimed. For this reasons, the comments are more constructive than evaluation (Anthony, & Bailey, 2004). According to a faculty member, that Dannels (2005) had interview in his work:

> "The pin up is where we pull the drawings off the desk you're currently working on, smack them up on the wall and look at them in a question and answer way, you tell me, then I respond back to you, until the whole class gets a sense of this is where we are" (Dannels, 2005, p. 144).

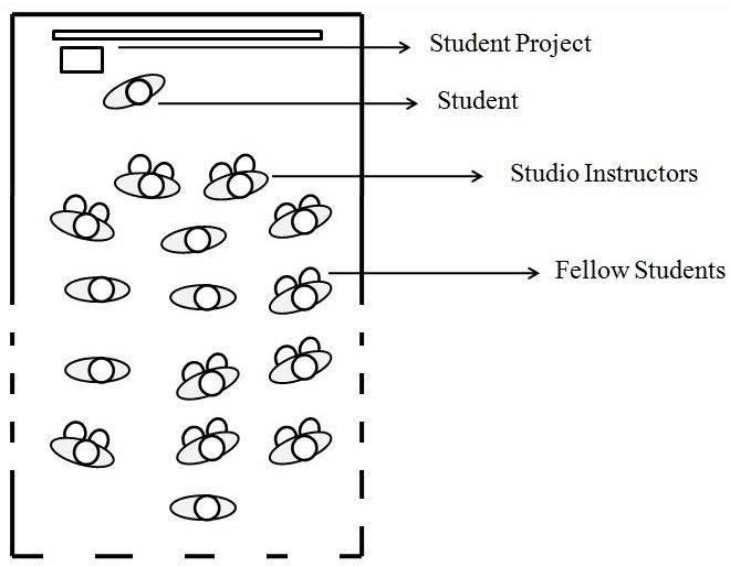

Figure 4. Plan scheme of pin-up critique (drawn by the author, 2015)

2.3.3.3. Group Critique

Even there is confusion in the literature about group critique; this study defines group critique as a critique technique where instructors and students discuss presented works of each student while being gathered around a desk (Oh et. al., 2013). In-

group critique, each student has also chance to listen and see the development process of other students (Oh et. al., 2013). On the other hand, Farivarsadri (2001) claims that group critiques are beneficial at the beginning of design semester and initiation of the design projects, since in the initiation of the projects, all students are trying to figure out possible design solutions and through group critiques each students may have chance to see each other's possible solutions. Since it is a informal setting, students who have a lack of confidence to speak in front of public, have chance to participate actively to critique and have chance to produce more solutions to the same design problems (Farivarsadri, 2001). With the help of group critiques, students could develop their design ideas by actively involving in the comments of other project solutions (Sagun, 2003).

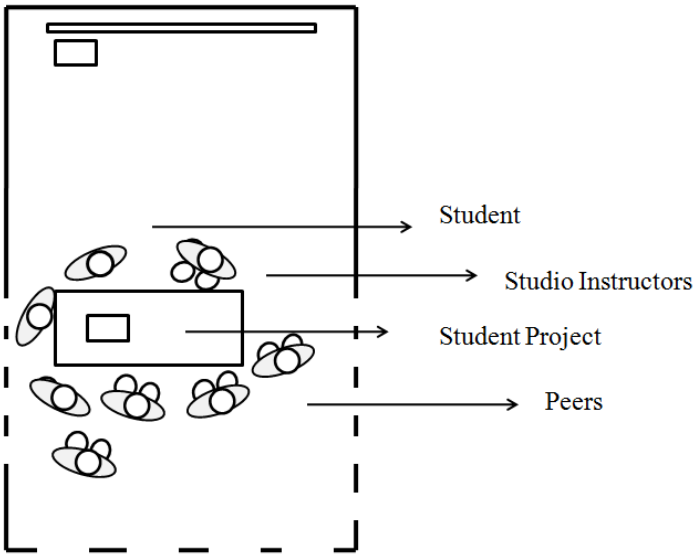

Figure 5. Plan scheme of group critique (drawn by the author, 2015)

2.3.3.4. Other Critique Techniques

Even for this thesis, three critique techniques are taken into consideration there are other critique techniques that are applied during different stages of architectural design process. To give an example, final critiques are the final stage of a design problem and provide students an expert perspective.

Students are generally preparing large panel in which they organize drawings expressing their design (Oh, 2010). Because it is a formal review, according to Argyris (1981), there is a syndrome called as *'mystery/ mastery syndrome'* referring to using complicated words emitting an atmosphere of mystery for demonstrating mastery of architectural knowledge. According to Oh (2010), this syndrome may derange students through making them complicated to comprehend professionals' comments and discussions. Dinham (1986) provides the following suggestions for formal (final) review:

(1) Students may be educated by evaluating and discussing about their projects in the final jury.

(2) Final juries are aimed to educate all the students at the same time in the design studios. For instance, while jury member comments on student work, the discussion on common concern occurs. In other words, students have chance to learn their missed parts from their classmates design.

(3) Since in the final juries, there are generally guests from professional architects. This provides students hearing challenging conversations regarding the subject.

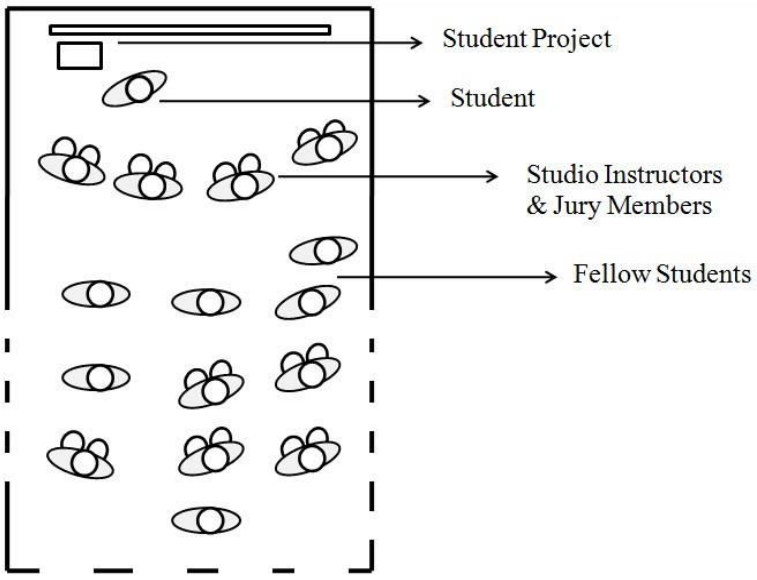

Figure 6. Plan scheme of final jury (drawn by the author, 2015)

Consequently, critique has a crucial role in the design studio. However, before deciding the best and beneficial critique type for the architectural design education process, student attitudes towards critiques should be also defined. Additionally, in different educational levels, different techniques of critiques could be preferred. The parameters of the given design problem, student education level, stages of design process are main factors that play a significant role in the decision of critique types (Oh et al., 2013).

2.4. Student Attitudes toward Critique Techniques

Within the framework of the study, the definition of the attitude term is based on the social psychology definition, which is figuring to individual's straightforward preferences (Allport, 1935). In the educational aspect, attitude is defined as tendency to reply positively or negatively to definite objectives (Martino, 2009). For this

thesis, attitude is accepted as student's standpoints and preferences through different critique techniques in design studios. In design studio, student attitudes toward critique techniques are significant. For architecture students, attitudes also means being qualified for studying architecture, and being an architect having own specific characters like, ability to communicate. According to Rohrbach (2005), design instructors may have a lack understanding of the restructure their teaching methods especially their critique methods with respect to student attitudes. Student attitudes toward a critique are also significant in term of interaction between instructor and students. Based on student complains and suggestions, instructors could improve their teaching and learning models to increase student abilities of understanding given feedback.

However, before moving student attitudes toward critique techniques, students' general attitudes in design studio should be mentioned. What Bakarman (2011) supposes is that students in design studio should have aptitude to produce several alternatives for progress their design knowledge whereas they understand of design problem. This is because, according to Lawson (1997), students should be 'solution-focused' not 'problem- focused' while they handle the design problems. According to Bakarman (2011), student attitudes may be shaped by the amount of experiences that they gain in design studio. Based on student experiences, a design student has to gather the professional attitudes like having professional performance while handling the design problem, managing time, gaining knowledge and controlling them (Bakarman, 2011). Additionally, Cross (2006) listed student attitudes and aptitudes in design studio as follows:

(i) The aptitude for collecting the related information engage in design problem,

(ii) The aptitude for gaining experiences, since studio masters' aptitude is based on the amount of experiences that student gains,

(iii) Students have attitude of figuring out most of design problems and utilize the significant parts of them,

(iv) Student attitudes toward design problem should have to be solution- oriented,

(v) Students bargains with peers, and other studio members.

Some students could understand and apply the given critique in much better way whereas others have difficulty. Since a critique is an interaction between student and instructor, student response is important. To categorize student attitudes toward different critique techniques, Kent (2001) categorized the students as follows: (1) thinkers, (2) listeners, (3) skeptics, (4) misunderstanders, (5) followers, and the (6) affirmed ones. Thinkers reflect what they hear from instructor and try to combine their ideas and instructor feedback on their design. Listeners understand the instructor feedback; however, they cannot come with an applied design. Skeptics are skeptical regarding instructor ideas and have tendency to discount the feedback they receive. Students who misunderstand instructor comments and apply what they want to hear. Followers remember and apply instructor critiques concretely. Finally, the affirmed one assumes that instructor has the same idea with their ideas (Kent, 2001). This study also used Kent's (2001) categorization and analyzed the correlations between the critique techniques and student categories.

CHAPTER III

CASE STUDY

3.1. Aim of the Study

The main aim of this thesis is to find out the statistical relationship between student attitudes toward different critique techniques and their final performance scores. It is aimed to explore statistical correlations between student attitudes toward desk, group and pin-up critique and their preferences. This study also aims to find out whether there is any correlation between student positive attitudes toward critique techniques and these critique techniques contribution to design education process.

3.1.1. Research Questions

The research questions of this thesis are as follows:

1) Is there any statistically significant relationship among different critique techniques in terms of student preference? (i. group and pin-up critiques, ii. desk and group critiques, iii. pin-up and desk critiques)

2) How student attitudes towards different critique techniques are correlated with each other?

3.1.2. Hypothesis

The hypotheses of this thesis are as follows:

H1: There is a statistically significant relationship between student attitudes toward different critique techniques and their GPA.

H2: The contribution of a critique technique to design education process is highly correlated with student preference for this critique technique.

3.2. Methodology

Figure 7 emphasizes the settings of desk critique. The mediums are sketches, ortographic drawings, 3D models. The instructor and a student are sitting near a drawing desk and they interact with each other. Figure 8 also presents an exemplary final jury situation, in which a student pin up his drawings on wall, and instructors and the other students listen his representation of the project solution. The setting of the final jury is similar with pin-up critiques. However, during pin-up critiques, generally, two design studio instructors, who had already know student's process, listen to project representation, and there are more students listen to the pin-up critique. Figure 9 depicts an exemplary group critique session, in which instructor and students stand or sit near a desk.

Figure 7. The setting of desk critique (taken by the author, 2015)

Figure 8. The final jury (taken by the author, 2015)

Figure 9. The group critique (taken by the author, 2015)

3.2.1. Sample Group

In order to analyze the effects of different critique techniques on student attitudes, experiences and success, 3rd grade Interior Architecture and Environmental Design students at Bilkent University are chosen from the 2014- 2015 Fall Semester. There are three sections and each section has 30 students. 84 out of 90 students are participated to the survey. The reasons of why 3rd grade students are selected are as follows:

(1) Because of the complexity of the projects, 3rd year design studio requires different critique techniques.

(2) Third year students start to transform the knowledge gained from other courses and initiate to solve spatial problems more in detail.

(3) Third year students are more familiar with different critique techniques compared to 1st and 2nd year students.

3.2.2. Procedure

A survey, which is composed of four parts, is conducted. In the first part, the author collected data related to students demographics, such as name, gender, previous semester design grades and student GPAs. In this part, students have also chosen one of the six student categories that are thinkers, listeners, misunderstanders, skeptics, followers and affirmed ones that they find close to themselves during the critique in design studios (See Appendix A.1).

In the second part, student attitudes toward different critique techniques are explored through the five point Likert scales (5 for 'Strongly Agree' and 1 for 'Strongly Disagree') (See Appendix A.2). In total, there are 25 statements and eight of them about group critique, nine of them related with pin-up critique and eight of them related with desk critique. In the third part, five point Likert scales (5 for 'Very Satisfied' and 1 for 'Very Dissatisfied') are used with 21 statements 7 for each critique techniques that concentrate on student satisfaction degrees toward different critique techniques (See Appendix A.3). Last part includes open-ended questions,

where students have chance to share their own ideas regarding each critique technique and some further suggestions (See Appendix A.4). According to Cronbach's Alpha, the reliability of the survey is 0.926.

This survey was held on 22, 23 December in 2014-2015 Fall Semester. The results of the survey are analyzed both quantitatively and qualitatively. Quantitative data analysis is done with the Statistical Package for the Social Sciences 20 (SPSS). The statistical calculations, descriptive statics, chi- square, t-test and correlation matrices are used. The statistical data is discussed in three parts. In the first part, descriptive statistics involves descriptive tables according to the number of participants, their gender, design grades and GPAs. In this part, student responses to the satisfaction degrees are also analyzed through descriptive analyses. To figure out student categorization and its relation with students' success, t-test is conducted in this part.

In the second part, correlation analysis is used to identify the correlations between critique techniques and student attitudes toward these critique techniques. The correlation matrices are calculated to identify associations between attitude items. The relationship between items are stated in terms correlation coefficients i.e. between 0.9 and 1.0 indicates very highly correlation between two variables whereas between 0.5 and 0.7 indicates moderately correlation and between 0.3 and 0.5 indicates a low correlation (Argyrous, 2005). In the third part, student experiences and views are shared in the form of direct quotations.

The grading system of Bilkent University is used while analyzing the results (*Grading and Grade Point Average*, 25 May 2015). Bilkent University uses letter-grading scheme with plusses and minuses showed in Table 6. Considering this system, 'A+' is the highest grade, pointed 100 whereas F is the lowest grade pointed between 0- 49. Between A+ to D grades are passing for design studios and below 'F' is failing grade. In this study, 'A' to 'C' is called as successful whereas below 'C' is unsuccessful. In terms of GPA ranges, 2.00 to 2.99 are called as successful whereas 3.00 to 3.49 are honor and 3.50 to 4.00 are high honor degree.

Table 6. The point grades and the range of quality equivalents (*YOK*, 2015)

Point	***Quality point equivalents***
100	4.00
96-100	3.70- 4.00
91-95	3.58- 3.69
86-90	3.36- 3.57
81-85	3.19- 3.35
76-80	2.93- 3.18
71-75	2.72- 2.92
66-70	2.50- 2.71
61-65	2.33- 2.49
56-60	2.12- 2.32
50-55	1.86- 2.11
0- 49	1.00-1.85

Table 7. The letter grades and Quality point equivalents (*Bilkent University*, 25 May 2015)

Letter Grade	***Quality point equivalents***
A+	4.00
A	4.00
A-	3.70
B+	3.30
B	3.00
B-	2.70
C+	2.30
C	2.00
C-	1.70
D+	1.30
D	1.00
F	0.00
FX	0.00
FZ	0.00

CHAPTER IV

RESULTS

4.1. Descriptive statistics

Descriptive statistics aims to categorize and describe the data through showing relationships between the variables (Boxill, Chamber & Wind, 1997). In this part, it is aimed to mention the general descriptive of 3rd grade Interior Architecture and Environmental Design students at Bilkent University.

According to the results, there are 68 female students and 16 male students attending the survey. The mean of their previous semester design grade is 80, fitted B in letter grade. The mean of 2014-2015 Fall Semester final design jury grade is 77, fitted B- in the letter system. Besides the design grades, students' Grade Point Average (GPA) are also asked and the mean of GPA is 2.50 out of 4.00. In terms of gender distribution, the mean of female GPAs is 2.46 whereas the mean of male GPAs is 2.66.

As it is mentioned in the literature review, there are six types of students that are (1) thinkers, (2) listeners, (3) skeptics, (4) misunderstanders, (5) followers, and the (6)

affirmed ones (Oh et. al., 2013). To figure out this, in Part A of the survey, the definitions of each student type are provided and asked to the students to choose only one type that they find close to their profile categorization corresponding to their design critique behavior. According to the results, there are 21 thinkers, 10 listeners, 13 skeptics, misunderstanders 7, followers 10 and 3 affirmed ones.

Descriptive analyses of student categorization and their GPAs are drawn in Table 8. Thinker students, who reflect what they hear from the instructor and attempt to combine their thoughts and instructor feedback on their own design have the highest grade point average (Mean= 2.52, SD: 0.750). Followers who remember and apply the instructors' concrete critiques have the second higher GPA (Mean= 2.40, SD: 0.518).

Table 8. Descriptive analyses of student categorization and GPA mean

	N	***GPA Mean***	***Std. Deviation***
Thinkers	21	2.52	0.750
Listeners	10	2.30	0.483
Skeptics	13	2.15	0.689
Misunderstanders	27	2.24	0.505
Followers	10	2.40	0.518
Affirmed ones	3	2.33	0.577
Total	84	2.33	0.604

Besides GPA, the relation between student categorization and their final grade is also mentioned in Table 8. Skeptics, who are skeptical regarding the instructor ideas about their design and have tendency to discount the feedback they receive, have the highest mean value with 2.54 (SD: 0.660).

Table 9. Descriptive analyses of student categorization and final grades

	N	*Mean*	*Std. Deviation*
Thinkers	21	2.00	0.548
Listeners	10	1.70	0.483
Skeptics	13	2.54	0.660
Misunderstanders	27	2.44	0.801
Followers	10	1.90	0.316
Affirmed	3	1.67	0.577
Total	84	2.17	0.636

To gain reliable data and consider the continuity of the process in design studio, students previous semester design grades become also important for the study. Table 9 highlights the means and standard deviations for each student type. Affirmed students have the lowest mean value with 1.67 (SD: 0.555), whereas highest mean occurs in skeptics with the 2.15 mean value (SD: 0.555). In the light of these descriptive analyses, it can be understood that skeptics and misunderstanders are more successful in design studio, whereas affirmed students have the lowest mean in their design studio grades.

Table 10. Descriptive analyses of student categorization and previous semester final grades

	N	*Mean*	*Std. Deviation*
Thinkers	21	1.95	0.384
Listeners	10	1.80	0.422
Skeptics	13	2.15	0.555
Misunderstanders	27	2.04	0.437
Followers	10	2.00	0.471
Affirmed	3	1.67	0.577
Total	84	1.99	0.451

Besides the descriptive analyses, ANOVA is also conducted to find out whether student categorization has any influence on student final grades and GPA (Table 11). The results show that there is a statistical difference among students categorization types and their final grades between groups (F (5.78) = 4.005, *df*: 5, *p:* 0.003, η^2: 0,245) (Appendix B.1.).

Table 11. Analyses of Variance between final grades and students categorization

	Sum of Squares	***df***	***Mean Square***	***F***	***Sig.***
Between groups	8.103	5	1.621	4.005	0.003
Within Groups	31.564	78	0.405		
Total	39.667	83			

In addition to final grades, the study finds that there is not a statistical difference among students' categorization types and their GPA (F (5, 78): 0.807, *df*: 5, *p*: 0.548, η^2: 0.004) (Table 12) (Appendix B2).

Table 12. Analyses of Variance summary table between GPA and students categorization

	Sum of Squares	***df***	***Mean Square***	***F***	***Sig.***
Between groups	1.487	5	0.297	0.807	0.548
Within Groups	28.746	78	0.369		
Total	30.233	83			

4.2. Student attitudes and success toward different critique techniques

Student responses to the 25 attitude statements (8 group critique statements, 9 pin-up critique statements, 8 desk critique statements) are analyzed. According to highest mean, students feel comfortable while asking questions in desk critiques (Mean= 4.45). The lowest statement mean is that students prefer group critiques rather than desk critiques (Mean= 2.48). When the gender difference is considered, Mean values of three critique statements are also calculated separately. The highest mean average is calculated in desk critique statements (Mean= 4.33) that is followed respectively by pin- up critiques (Mean= 3.39) and group critiques (Mean= 3.07). In terms of gender issues, the highest mean for females (Mean= 4.45) among the desk critique statements is that they feel comfortable while asking questions in desk critique, Statement 19. The lowest mean for both females and males (Mean= 2.46) among desk critique statements is that they prefer group critique rather than desk critique,

Statement 24. When males are considered, the highest mean (Mean= 4.13) occurs in the statement of having positive attitude toward desk critique, Statement 16.

Student responses to the 21 satisfaction statements (7 group critique statements, 7 pin-up critique statements, 7 desk critique statements) are also analyzed. According to the satisfaction statement results, Statement 17, 'Understanding the given feedbacks in desk critique' has the highest mean (Mean= 4.43). The lowest mean for is the Statement 6, 'the way how group critiques are delivered' (Mean= 3.17). Table 13 illustrates means and standard deviations for student satisfaction degrees of a desk critique. An independent sample t- test is conducted to figure out whether there are statistically relationship between gender and the statement 'understanding the given feedbacks in desk critique', statement 17. According to the result, there is not a significant difference in the scores for male (M= 4.25, SD: 1.065) and female (M=4.47, SD: 0.657) for the Statement 17 (t (82): -1.061, p: 0.292) (Appendices B.3, B.4).

When gender is considered, the Statement 17 'understanding given feedbacks in desk critique' has the higher mean value (Mean= 4.43) whereas the Statement 6 'the way that group critique delivered' has the lowest mean value for females (Mean=3.17). On the other hand, males have the highest mean (Mean= 4.44) with the Statement 16, 'learning experience and gaining knowledge in desk critique'. Male students has the lowest mean (Mean= 3.06) with the Statement 3, 'learning experience in group critique' and 'available amount of time allocated for group critiques'.

Table 13. Means and standard deviations for students' satisfaction degrees of a desk critique

	Mean	*Std. Deviation*
Interaction with instructor in desk critique	4.31	0.905
Learning experience in desk critique	4.38	0.890
Understanding the given feedbacks in desk critique	4.43	0.749
Written feedbacks on sketches or working tools in desk critique	4.26	0.933
Available amount of time allocated for the desk critique	4.14	1.020
The way how the desk critique is delivered	4.17	0.967
Instructor attitudes during desk critique	4.23	0.949

Besides the gender and mean relations, student GPAs and their preferences in terms of critique techniques are also analyzed in relation to the highest and the lowest mean value distribution. The Statement 19, 'I feel comfortable while asking questions in desk critique' has higher mean in the attitude statements (Mean= 4.45). Table 14 illustrates the relationship between students GPA ranges and their agreement degrees with this statement. In the Table 15, the students GPA ranges and the relation with preferring group critiques rather than desk critique is mentioned. Students, who are successful, range between 2.00 to 3.00, highly disagree with this statement.

Table 14. Cross tabulation between GPA ranges and highest mean attitude statement

	Feeling comfortable while asking questions in desk critique					***Total***
GPA Range	*Strongly disagree*	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly agree*	
1.80 ≤ x≤ 1.99	0	0	0	1	0	1
2.00 ≤ x≤ 2.99	2	0	7	14	37	60
3.00 ≤ x≤ 3.49	0	2	1	1	14	18
3.50 ≤ x ≤ 4.00	0	0	0	0	5	5
Total	2	2	8	16	56	84

Table 15. Cross tabulation between GPA ranges and 'Prefer group critique rather than desk critiques'

	Prefer group critiques rather than desk critiques					*Total*
GPA Range	*Strongly disagree*	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly agree*	
1.80 ≤ x≤ 1.99	0	1	0	0	0	1
2.00 ≤ x≤ 2.99	14	18	19	5	4	60
3.00 ≤ x≤ 3.49	2	10	1	4	1	18
3.50 ≤ x ≤ 4.00	1	2	1	0	1	5
Total	17	31	21	9	6	84

It is hypothesized that there is a statistically significant relationship between student attitudes on different critique techniques and their GPA. To test this hypothesis, cross tabulations and chi square tests are conducted. Students, whose final grades A and

A-, mostly agree with the Statement 23, 'I prefer desk critique rather than pin-up critique'.

Table 16. Cross Tabulation shows the relation between students' final grades and their preference desk critic rather than pin- up critiques.

	I prefer desk critique rather than pin- up critique					***Total***
Students final Grades	*Strongly disagree*	*Disagree*	*Neither agree Nor disagree*	*Agree*	*Strongly Agree*	
A, A-	0	0	1	1	8	10
B+, B, C+, C	2	4	7	5	36	54
C-, D+, D	0	0	3	6	7	16
F	1	0	0	3	0	4
Total	3	4	11	15	51	84

In the following sessions, to figure out the relations between GPA and students attitudes toward group, pin-up and desk critique techniques, cross tabulations and chi square test are conducted for each critique technique. Moreover, student preferences and attitudes toward different critique techniques are also discussed.

4.2.1. Group Critique

A Pearson Chi-Square test is conducted to examine whether there is any statistically significant relationship between student attitudes toward group critiques and the GPA. According to the results, there is not a statistically significant relationship between student attitudes toward group critique and their GPA (X^2 (16.719, N= 84),

p= 0.671) (Appendix B.5). Table 17 illustrates the cross tabulation between student attitudes toward group critique and GPA.

Table 17. Cross tabulation between student attitudes toward group critique and GPA range

	Students attitudes toward group critique					***Total***
GPA Range	*Strongly disagree*	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly agree*	
1.80 ≤ x≤ 1.99	0	0	0	1	0	1
2.00 ≤ x≤ 2.99	9	8	16	16	11	60
3.00 ≤ x≤ 3.49	1	5	3	9	0	18
3.50 ≤ x≤ 4.00	1	0	1	2	1	5
Total	11	13	20	28	12	84

Chi- square test is conducted to examine whether there is any statistically significant relationship between student preferences of group critique and pin up critiques. It is accepted that results are statistically significant when $p<0.05$. As a result, there is not a statistically significant relationship between student preference between group and pin-up critique (X^2 (20, N=84) = 12.99, p= 0.59).

4.2.2. Pin-up Critique

Number of 29 students agreed with the statement that ' I have positive attitude toward pin- up critique'. The highest students' number is under the 'Agree' item with 21

students and their GPA range between 2.00 and 2.99 (Table 18). A Pearson Chi-Square test is conducted to examine whether there is any significant relationship between student attitudes toward different pin-up critiques and their GPA.

According to the results, there is not a statistically significant relationship between student attitudes toward pin-up critique and their GPA (X^2 (8.647, N= 84), p= 0.987) (Appendix B.6). Besides the relationship between GPA, it is applied that Chi square test to the pin-up critiques and desk critiques in terms of students preferences, and according to result, there is not any statistically significant relationship between pin-up and desk critiques (X^2 (20, N=84)=10.41, p= 0.86).

Table 18. Cross tabulation between students' attitudes toward pin-up critique and GPA range

	Students attitudes toward pin-up critique					***Total***
GPA Range	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	
1.80 ≤ x≤ 1.99	0	0	1	0	0	1
2.00 ≤ x≤ 2.99	1	10	17	21	11	60
3.00 ≤ x≤ 3.49	0	4	6	6	2	18
3.50 ≤ x≤ 4.00	0	0	2	2	1	5
Total	1	14	26	29	14	84

4.2.3. Desk Critique

Besides group and pin-up critiques, desk critique is also asked to students. Table 19 shows cross tabulation concerning student attitudes toward desk critique and GPA. However, there is not a statistically significant relationship between student attitudes toward desk critique and GPA (X^2 (8.851, N= 84), p= 0.885) (Appendix B.7). Chi square test is also conducted to examine the relationship between student preferences towards desk and group critiques. There is a highly statistically significant relationship between student preferences of desk and group critiques (X^2 (20, N=84) = 33.63, p= 0.006).

Table 19. Cross tabulation between students' attitudes toward desk critique and GPA range

	Students attitudes toward desk critique					***Total***
GPA Range	*Strongly disagree*	*Disagree*	*Neither agree nor disagree*	*Agree*	*Strongly agree*	
1.80 ≤ x≤ 1.99	0	0	0	1	0	1
2.00 ≤ x≤ 2.99	1	0	9	19	31	60
3.00 ≤ x≤ 3.49	0	0	2	3	12	17
3.50 ≤ x ≤ 4.00	0	0	0	1	5	6
Total	1	0	11	24	47	84

4.3. Correlations of students' attitudes and preferences for critique techniques

"Pearson Correlation Coefficient is a numerical measure of the amount of relationship between two sets of scores and it ranges from -1 to 1" (Howitt & Cramer, 1999, p.71). Since the data is ranked, Spearman's rho is applied to the desk critique attitude statements. Analyzing correlation scores are also important for understanding the relationship degree. A correlation point of 1.00 means there is perfect association between variables whereas -0.5 may indicate negative moderate relationship (Howitt & Cramer, 1999).

Through the light of Spearman's rho, Table 20 illustrates the correlation matrix of student attitudes towards desk critique. According to the results of correlation matrix, the highest correlation occurs between the following statements of desk critiques: 'desk critiques are better for design process' (Statement 21) and 'I prefer desk critiques rather than pin- up critiques' (Statement 23) (0.919). The second largest correlation occurs between the statements of 'learning more in desk critiques' (Statement 18) and 'preferring desk critique rather than group critique' (Statement 22) (0.829). 'Learning more in desk critique' is also highly correlated with 'I prefer desk critique rather than pin-up critique' (0.811).

'Desk critique is useful when the same instructor give the critique each time' (Statement 19) is highly correlated with 'I prefer desk critique rather than pin-up critique' (Statement 23) (0.803). There is also a high correlation between the following statements: 'desk critique is better for design process' (Statement 21) and 'I prefer desk critique rather than pin- up critique' (Statement 23) (0.784). A medium

correlation for desk critique occurs between the following statements: 'I ask more questions in desk critique' (Statement 20) and 'I have positive attitude toward desk critique' (Statement 16) (0.530). Briefly, it can be said that there is almost a perfect association between 'students thinking desk critique is better for design process' (Statement 21) and 'students preferring desk critique rather than group critique' (Statement 22) (0.919). There is a moderate association between 'asking more questions in desk critique' (Statement 20) and 'having positive attitude toward desk critique' (Statement 16) (0.589).

Table 20. Correlation matrix of students attitudes towards desk critique (Spearman's rho, n= 84)

Spearman's rho	*I have positive attitude toward desk critique*	*Desk critique are useful when same instructor give critique each time*	*I learn more in desk critique*	*I feel comfortable while asking questions in desk critique*	*Students in desk critique ask more questions*	*Desk critique are better for design process*	*I prefer desk critique rather than group critique*	*I prefer desk critique rather than group critique*
I have positive attitude toward desk critique	1.000							
Desk critique are useful when same instructor give critique each time	0.571**	1.000						
I learn more in desk critique	0.668**	0.737**	1.000					
I feel comfortable while asking questions in desk critique	0.589**	0.621**	0.722**	1.000				
Students in desk critique ask more questions	0.530**	0.648**	0.675**	0.721**	1.000			
Desk critique are better for design process	0.596**	0.760**	0.798**	0.783**	0.744**	1.000		
I prefer desk critique rather than group critique	0.641**	0.803**	0.829**	0.813**	0.689**	0.919**	1.000	
I prefer desk critique rather than pin-up critique	0.610**	0.684**	0.811**	0.738**	0.585**	0.784**	0.816**	1.000

** Correlation is significant at the 0.01 level (2- tailed)

Regarding the Hypothesis 2, whether there is a correlation between preferred critique techniques and its contribution to the design process, another correlation matrix is conducted. Table 21 illustrates the correlation matrix. According to the table, 'desk critique is better for design process' (Statement 21) and 'preferring desk critique rather than group critique' (Statement 22) is highly correlated with each other (0.919). This result supports the second hypothesis that is related with student preferences of a critique technique and its contribution to design process. 'Group critiques are better for design process' (Statement 6) and 'preferring group critique rather than desk critiques' (Statement 24) are correlated (0.680). 'Pin- up critiques are better for design process' (Statement 15) and 'preferring pin-up critiques rather than group critiques' (Statement 25) are also moderately correlate with each other (0.504). Briefly, it can be said that critique techniques contribution to design process is highly correlated with student preference of these critique techniques (Table 21).

Table 21. Correlation matrix of students' preference and these critique techniques contribution to design process

	Prefer group critiques rather than desk critiques	*Group critiques are better for design process*	*Pin-up critiques are better for design process*	*Prefer pin-up critiques rather than group critiques*	*Prefer desk critique rather than group critique*	*Prefer desk critique rather than pin-up critique*	*Desk critique are better for design process*
Prefer group critiques rather than desk critiques	1.000						
Group critiques are better for design process	0.680**	1.000					
Pin-up critiques are better for design process	0.315**	0.266*	1.000				
Prefer pin-up critiques rather than group critiques	0.111	0.156*	0.504**	1.000			
Prefer desk critique rather than group critique	-0.515**	-0.291**	-0.109	-0.068	1.000		
Prefer desk critique rather than pin-up critique	-0.424**	-0.241*	-0.199	0.116	0.816**	1.000	
Desk critique are better for design process	-0.454**	-0.240*	-0.134	0.099	0.919**	0.784**	1.000

**, Correlation is significant at the 0.01 (2-tailed), * Correlation is significant at the 0.05 (2-tailed)

Because of the highest means and correlations occurs in desk critique, the correlation matrix of student satisfaction level with desk critique is also analyzed. Table 22 illustrates the correlation matrix of student satisfaction levels with the desk critique. There is a highly correlation between 'the way how desk critiques delivered' (Statement 20) and 'instructor attitudes during desk critique' (Statement 21) (0.877). 'The way how desk critics delivered' (Statement 20) is also correlated with 'available amount of time allocated for desk critique' (Statement 19) (0.818).

Table 22. Correlation matrix of students' satisfaction levels with desk critique

Desk critique	*Interaction with instructor*	*Learning experience*	*Understanding the given feedback*	*Written feedback*	*Available amount of time*	*The way how it is delivered*	*Instructor attitudes*
Interaction with instructor	1.000						
Learning experience	0.689**	1.000					
Understanding the given feedback	0.709**	0.728**	1.000				
Written feedbacks on working tool or sketches	0.559**	0.517**	0.786**	1.000			
Available amount of time allocated	0.461**	0.616**	0.613**	0.594**	1.000		
The way how it is delivered	0.574**	0.723**	0.648**	0.619**	0.818**	1.000	
Instructors attitudes	0.577**	0.695**	0.659**	0.613**	0.751**	0.877**	1.000

** Correlation is significant at the 0.01 level (2-tailed)

4.4. Students comment on different critique techniques

This part involves student comments on critique techniques based on their direct quotations taken from the answers of open-ended questions (Appendix A.4). These questions are related with further suggestions about each critique techniques. It is observed that students have a tendency to answer predominantly under the effectiveness of critique session for both suggestions (Question b) and effectiveness questions (Question c).

The student comments are grouped under the three types of common answers related with the effectiveness question 'how can be critiques made more effective' (Question c). The first one is related with time whereas second one is about the design process. The third one is about teaching styles. The quotations related to the time spared in design studio, have criticism to the current allowed time for critiques and design studio. Some examples are as follows:

There should be equal and more time for all different kinds of critiques during the process (Student # 7).

At the beginning of each design problem, we find ourselves suddenly inside of the project. We need more time to analyze the design requirements; we need more group critiques and pin-up critiques at the beginning of the semester (Student # 22).

The design studio days should be more than 2 days for a week. At least a student should have critics two times in a week (Student # 75).

I would like to have time to see resembling projects in the design studios. I would also like to see how the instructors might find solutions for the same design problems. This may be an effective way to make me learn how to design (Student # 9).

Comments related with the design process are more about suggestions for the current critique techniques. The importance of interaction between instructor and peers are also suggested through critique techniques. For students commented on pin- up critiques, pin- up critiques has meaning of process. For those, in pin-up critiques, students are in more interaction with the design environment. Solely a one student suggests seminar type lessons for design studio in the initiation of the project (Student # 45)

Interactive critiques pin-up and group critiques, are much better for inspiring and developing design process (Student, # 3).

If students have chance to take desk critique in a lesson, following lesson should be group. Group critiques are like brain storming sessions and more questions and ideas occur but may cause confusion (Student, # 14).

Research should be in the base of design studio. We need to be encouraged to research similar projects during the process of design (Student # 36).

To understand the design problem given at the beginning of semester, we need more brainstorming and we should have more research sessions that can be done with instructors (Student # 78).

We need more pin-up critiques to be aware of the process (Student # 12).

There should be more seminars related to the conceptual thinking at the beginning of the each projects (Student # 45).

The suggestions related to the teaching styles are quoted here. According to students who comment on this issue, written feedbacks have a role on their success and development on the projects. This supports the literature regarding the effects of teaching styles on the student success. During critiquing, communication modalities like speech, drawing, and gesture have structured the critique sessions and may affect student success (Oh et. al., 2013).

If both instructors give the critiques to the same students at the same time, critiques may be more effective (Student, # 21).

I would like to see more written feedbacks on my sketches. The written feedbacks that instructor write during the desk critique are the one of the most valuable thing (Student # 37).

Through the sketches that instructor draw on the tool that I come with to the desk critique, I remember all the key points, and inspire new design solutions (Student # 13).

We need more clear critiques that show how to develop the design and possible solutions for the problematic spaces. I learn through seeing and imitating (Student # 53).

4.5. Discussion

In the literature review, there are methodologies to determine student's attitudes in the educational environments. There are explicit and implicit measurements of attitudes (Moody, 2010). Explicit attitudes can be reported and deliberately controlled whereas implicit attitudes may not be controlled and reported (Rydell, & McConnell, 2006). In the case of measurement attitudes even they are explicit or implicit in the educational environment, this study provided student satisfactions and attitudes regarding group, pin-up and desk critiques. It can be said that student attitudes may be altered according to their experiences, personal backgrounds, their personalities etc. From this respect, this study provides similar attitude statements that mentioned in the architectural design education literature.

Analyzing the effects of different critique techniques on the success of interior architecture students depends on achieving student attitudes, satisfactions and experiences toward these critique techniques. There is not found any relationship between student attitudes on desk, pin-up and group critiques and students GPAs as it was hypothesized. Additionally, it is found that most of the students prefer desk critiques rather than group and pin-up critiques. Students have tendency to take desk critiques with the same instructor. As Koch et al. (2002) stated, desk critiques are the best technique in design studio to follow student's design process. It is also found that desk critiques are better for design process compared to other critique techniques.

In addition to the desk critique, through the open-ended questions, it is achieved that students wants group critiques at the initial steps of design process. However, they suppose that group critique can cause confusion. In the literature, Farivarsadri (2001) mentioned that group critiques are proper at the early stages like preliminary of the design studios. This is because; it is suitable for students that have little experiences on the same design problem (Farivarsadri, 2001). The reason is that preferring desk critique to group critiques may be related with student comfort zone preferences. Students prefer desk critique since they become more comfortable when other students are not getting involved to the critique.

In addition to the critique technique preferences, some students supposed that when instructor draws a sketch on their design tools, they remember all the key points of critiques. This is also supported by Oh et al. (2013) that written critique has many advantages for students since through this way students construct stories.

Through the open- ended questions, student suggestions are obtained that are categorized in the following four categories: (1) Equal and more time for all critique techniques, (2) more pin-up critiques for design process, (3) providing more seminars on conceptual thinking, and (4) more written feedbacks on the sketches during the critique. Students want more time and equal time for each critique techniques in design studio because through this way, students could have chance to spend more time with instructors with a more focus and concentration on the design problem. This may also affect student success in design studios.

Furthermore, students suggest that through providing more pin-up critiques, design project could be processed more successfully. Since pin-up critiques are like interim critiques, students could complete their work and prepare presentation tools rapidly. This provides students completion of missed parts quickly and seeing other student level of design. If pin-up critiques are more used in design studios as a critique technique, students become more ready to find quick solutions, which could affect their success as well. Furthermore, students want more written feedbacks, because they understand through seeing and inspiring through the instructors sketches.

CHAPTER V

CONCLUSION

The objective of this thesis is to analyze the statistical relationship between student attitudes toward different critique techniques and their preferences. This thesis also aimed to figure out the correlations between critique techniques. This chapter presents summary of the findings.

In the literature review, it is stated that architectural design education aims to derive different kinds of design experiences through sharing the knowledge and experiences (Kahvecioğlu, 2001). In the architectural design education, critique is used as an educational tool identifying the problems and possible solutions (Silverman, 1992). Schön (1987) identifies the process of critiquing as an interaction that occurs through telling, listening and representation and imitation. The term of interaction is investigated in this study with response to the following objectives:

(i) To evaluate student attitudes toward desk critique, pin-up (interim) critique, and group critique.

(ii) To evaluate student degrees of success toward different critique techniques,

(iii) To analyze student experiences in terms of desk, pin-up and group critiques.

(iv) To analyze the effects of student categorization and its' effect on interior architecture student's success,

(v) To assist in creating methods for evaluating student attitudes, success and experiences.

Furthermore, as Kent (2001) stated, there are six types of students, which are thinkers, listener, skeptics, misunderstanders, followers and affirmed ones that are categorized through their attitudes toward critique techniques. Regarding this categorization and the survey applied to the sample group of 3rd grade Interior Architecture and Environmental Design students at Bilkent University in 2014-2015 Fall Semester, thinkers have the highest GPA mean compared to other student categorizations. However, in design studio, skeptics have the highest mean in the final grade that they received in final jury. In 2014-2015 Fall Semester, it can be said that in design studio, students who are skeptical about the critique that instructor provide are more successful compared to other student categorizations. Furthermore, in design studio, misunderstanders, who misinterpret the comment that instructor give and apply what they want to do, follow skeptics by having second highest mean. These results support the hypothesis and sub-hypotheses found in survey:

- There is a statistically significant relationship between preference for desk critique rather than pin- up critique and students final grades.

- There is no statistically significant relationship between student preference for group and pin-up critiques.
- There is no statistically significant relationship between student attitudes toward pin-up critique and their GPA.
- There is no statistically significant relationship between pin up critiques and desk critiques in terms of student preferences.
- There is a high statistical significant relationship between desk critique and group critique in terms of student preferences.
- There is a high correlation between 'desk critiques are better for design process' (Statement 21) and 'I prefer desk critiques rather than pin- up critiques' (Statement 23).
- There is a highly correlation between 'the way how desk critiques delivered' (Statement 20) and 'instructor attitudes during desk critique' (Statement 21).
- 'The way how desk critics delivered' (Statement 20) is also correlated with 'available amount of time allocated for desk critique' (Statement 19).

The methods that used in this thesis are limited to the sample group. Research could be more extensive by doing a longitudinal survey in different design studio grades and focusing on different stages of design process. Additionally, the study is limited with a method of questionnaires. Future research on this topic may include more qualitative and quantitative methods like focus group, in depth observation and experimental design during the critique more concentrating on student and instructor relationships.

REFERENCES

Afacan, Y. (2012). Investigating the effects of group working in studying interior architecture. *Procedia-Social and Behavioral Sciences*, *51* (1), 506-511.

Allport, G. W. (1935). Attitudes. *A handbook of social psychology*. Worcester, MA: Clark University Press. 798-844.

Altay, B. (2014). User-centered design through learner-centered instruction. *Teaching in Higher Education*, *19* (2), 138-155.

Anthony, K. H. (1991). *Design juries on trial: The renaissance of the design studio*. Available from http://www.worldcat.org/title/design-juries-on-trial-the-renaissance-of-the-designstudio/oclc/551574194?referer=di&ht=edition

Architecture School: Crits and Criticism. (2012). Retrieved from http://www.architecture-wiwik.com/arche-school-crits-and-criticism/

Argyris, C. (1981). Teaching and Learning in Design Settings. *Architectural Education Study*. New York, Andrew W. Mellon Foundation: 551- 660.

Argyrous, G. (2005). Statics for Research. (2nd edition). London: Sage.

Ashworth, S. (1998). Defining and Implementing a Teaching Style. Retrieved from:http://www.spectrumofteachingstyles.org/pdfs/literature/Ashworth_1998a_Defining%20&%20Implementing%20a%20Teaching%20Style.pdf

Bailey, R. (2004). The digital design coach: enhancing design conversations in architecture education (Doctoral dissertation), Victoria University, Wellington.

Bailey, R. (2005). Digital Tools for Design Learning. *In Proceedings of the 23rd conference on eCAADe, Lisbon, Portugal*, 131-138.

Bakarman, A. A. (2011). Attitude, skill, and knowledge: (ASK) a new model for design education. *Proceedings of the Canadian Engineering Education Association*. Retrieved from http://library.queensu.ca/ojs/index.php/PCEEA/article/view/3894/3976

Bilkent University. Grading and Grade Point Average. Retrieved from: //catalog.bilkent.edu.tr/current/general/grading.html

Boxill, I., Chambers, M.C., & Wint, E. (1997). Introduction to social research: With applications to the Caribbean. Jamaica: Canoe Press, University of the West Indies.

Burns, R. (1995). The adult learner at work, Sydney: Business and Professional Publishing.

Carrara, G., & Kalay, Y. E. (1991). Past, present, future: process and Knowledge in Architectural Design. *Knowledge-Based Computer-Aided Architectural Design, Elsevier Science Publishers BV, Amsterdam*, *7*, 147-201.

Chaikin, G. (1998). The computer and the studio. *Joint EAAE- ECAADE International Conferance on Human Computer Interaction*, Stuttgart.

Critique. (2015). *In the Oxford dictionary*. Retrieved from http://www.oxforddictionaries.com/definition/english/critique

Cross, N. (2006). *Designerly ways of knowing* (pp. 1-13). Springer London.

Cuff, D. (1991). *Architecture*: *The story of practice*. Retrieved from https://books.google.com.tr/books?hl=tr&lr=&id=RA440xSeYQ0C&oi=fnd&pg=PP13&dq=Cuff,+D.+ 1991).+Architecture:+The+story+of+practice.+The+MIT+Press.&ots=dFgqpTSD8T&sig=PX3ubP_XoewY769bkUYi_Frquz4&redir_esc=y#v=onepage&q&f=false

Daichendt, G. J. (2009). Redefining the Artist-Teacher. Art Education, *62* (5), 33-38.

Dannels, D. P. (2005). Performing tribal rituals: A genre analysis of "crits" in design studios. *Communication Education*, *54* (2), 136-160.

Demirbaş, Ö. O. (2001). *The relation of learning styles and performance scores of the students in interior architecture education* (Doctoral dissertation, Bilkent University).

Demirbaş, O. O. & and Demirkan, H. (2003). Focus on architectural design process through learning styles. *Design Studies*, *24* (5), 437-456.

Demirbas, O. O., & Demirkan, H. (2007). Learning styles of design students and the relationship of academic performance and gender in design education. Learning and Instruction, *17* (3), 345-359.

Di Martino, P., & Zan, R. (2010). 'Me and maths': towards a definition of attitude grounded on students' narratives. *Journal of Mathematics Teacher Education*, *13* (1), 27-48.

Dinham, S. M. (1986). Architecture Education: Is Jury Criticism a Valid Teaching Technique?. *Architecture Record*: 51- 53.

Duffy, F. (1995). Education in architecture. *Educating Architects*, 120-21.

Dunn, L. (2002). Theories of learning. *Learning and teaching briefing papers series*.

Dutton, T. A. (1991). The hidden curriculum and the design studio. *Voices in Architectural Education: Cultural Politics and Pedagogy. T. A. Dutton.* New York, Bergin & Gravey: 165.

Farivarsadri, G (2001). A critical view of pedogogical dimensions of introductory design in architectural education. Architectural education exchange. Cardiff University.

Fischer, G., Nakakoji, K., Ostwald, J., Stahl, G. & Sumner, T. (1998). *Embedding critics in design environments*. In M. Maybury, W. Wahlster (eds.), Readings *in* Intelligent User Interfaces, Morgan Kaufman Publisher, San Francisco, 537- 561.

Grading and Grade Point Average. Retrieved April 2, 2015 from the World Wide Web: http://catalog.bilkent.edu.tr/current/general/grading.html

Goldschmidt, G. (2002). One-by One: A pedagogic base for design instruction in the studio. Common Ground Design Research Society International Conference. Brunel University: Staffordshire University Press.

Goldschmidt, G., and Hochman, H., & Dafni, I. (2010). The design studio "crit": Teacher–student communication. *Artificial Intelligence for Engineering Design, Analysis and Manufacturing*, 24, pp 285-302. Doi: 10.1017/S089006041000020X.

Goldschmidt, G. (2012). A micro view of design reasoning: Two-way shifts between embodiment and rationale. In Carroll, J.M. (ed.), Creativity and rationale: Enhancing human experience by design. London: Springer Verlag, 41-55.

Graham, E. M. (2003). Studio design critique: student and faculty expectations and reality (Doctoral dissertation, Louisiana State University, USA). Retrieved from http://etd.lsu.edu/docs/available/etd-0611103-184324/

Gray, D. (2001). A briefing on work-based learning. Bristol: Higher Education Funding Council for England (HEFCE).

Gur, E. (2010). Open and cell-type design studios: their impact on architetural education. *ArchNet-IJAR*, *4*.

Harwood, E. (2007). Artists in the academy: Curriculum and instruction. *In International handbook of research in arts education.* Springer Netherlands.319-334.

Howitt, D., & Cramer, D. (1999). *A Guide to computing statistics with SPSS Release 8 for Windows*. Prentice Hall.

Kahvecioğlu, P.. N. (2001), Interaction of Knowledge and Creativity in Architectural Design Education (Doctoral dissertation), Istanbul Technical University, Turkey.

Kahvecioğlu, P. (July, 2007). Architectural design studio organization and cerativity. *ITU. 4* (2), 6-26.

Kelly, C. (1997). David Kolb, the theory of experiential learning and ESL. *The Internet TESL Journal, 3* (9), 1-5.

Kent, L. A. (2001). The case of Lucio Pozzi: An artist/teacher's studio critique method (Doctoral dissertation), Teachers College, Columbia.

Koch, A., Schwennsen, K., Dutton, T. A. & Smith, D. (2002). The redesign of studio culture: A report of the AIAS studio culture task force. The American Institute of Architecture Students.

Kolb, D. A. (1984). Experiential learning: Experience as the source of learning and development (Vol. 1). Englewood Cliffs, NJ: Prentice-Hall.

Kotzee, B. (2012). Private practice: Exploring the missing social dimension in 'reflective practice'. *Studies in Continuing Education*, *34* (1), 5-16.

Lawson, B. (1997). How designers think: The design process demystified. *Butterworth Architecture*, Oxford, UK.

Ledewitz, S. (1985). Models of design in studio teaching. *Journal of Architectural Education*, *38* (2), 2-8.

Maturana, B. C. (2014). Where Is the 'Problem'in Design Studio: Purpose and Significance of the Design Task. *International Journal of Architectural Research: ArchNet-IJAR*, *8* (3), 32-44.

Moody, S. (2010). Students' Attitudes Toward Their Major Discipline: Implicit versus explicit measure of attitude. (A dissertation, Western Carolican University).

Nicol, D. and Pilling, S. (Eds.). (2005). Changing architectural education: Towards a new professionalism. Taylor & Francis.

Oh, Y. (2010). Toward a theory of design critiquing-the furniture design critic program (Doctoral dissertation, Carnegie Mellon University, USA). Retrieved from http://dl.acm.org/citation.cfm?id=2519875

Oh, Y., Ishizaki, S., Gross, M. D., & Do, E. Y. L. (2013). A theoretical framework of design critiquing in architecture studios. Design Studies, *34* (3), 302-325.

Ostermann, A. C. (1998). Drawing on words and words on drawings: Construction of identity and negotiation of expertise in design juries in the school of architecture. *In American Association for Applied Linguistics Conference, Seattle, WA*.

Rohrbach, S. (2005). Responding to the changing roles of designers: *Fostering the critical analysis and verbal communication skills of students through the evaluation of design work.* Presented at the AIGA National Design Education Conferance, Philedelphia, PA, USA.

Rydell, R. J., & McConnell, A. R. (2006). Understanding implicit and explicit attitude change: A system of reasoning analysis. *Journal of Personality and Social Psychology. 91*. 995-1008.

Sagun, A. (2003). Evolutionary collaborative design studios (Doctoral dissertation. Bilkent University, Turkey).

Sagun, A., Demirkan, H. & Goktepe, M. (2001). A framework for the design studio in web based education. Journal of Art and Design Education, *20* (3): 332-342.

Salazar, S. M. (2013). Laying a foundation for artmaking in the 21st century: A description and some dilemmas. Studies in Art Education, 54 (3), 246.

Salazar, S. M. (2013). Studio interior: Investigating undergraduate studio art teaching and learning. *Studies in Art Education, 55* (1), 64.

Saljo, R. (1979). Learning about learning. *Higher Education, 8* (4), 443-451.

Schön, D. (1963). *The Displacement of Concepts.* Tavistock, London.

Schön, D. A. (1983). *The reflective practitioner: How professionals think in action* (Vol. 5126). Basic books.

Schön, D. A. (1984). The architectural studio as an exemplar of education for reflection-in-action. *Journal of Architectural Education*, *38* (1), 2-9.

Schön, D. A. (1985). *The design studio: An exploration of its traditions and potentials*. London: RIBA Publications.

Schön, D. A. (1987). *Educating the reflective practitioner: Toward a new design for teaching and learning in the professions*. San Francisco: Jossey-Bass.

Schön, D. A. (1992). Designing as reflective conversation with the materials of a design situation. *Research in Engineering Design*, *3* (3), 131-147.

Shuell, T. J. (1986). Cognitive conceptions of learning. *Review of educational research*, *56* (4), 411-436.

Schuell, T. J. (1988). Classroom assesment: what teachers need to know (5th ed.), Boston: Allyn & Bacon.

Schunk, D. H. (1996). Learning theories. *Printice Hall Inc., New Jersey*.

Silverman, B. G. (1992). Survey of Expert Critiquing Systems: Practical and Theoretical Frontiers, Communications of the ACM. *35* (4): 106- 127.

Smith, D. M. & Kolb, D. A. (1996). User's Guide for the Learning- Style. Boston: McBer & Company

Spiridonidis, C., & Voyatzaki, M. (1998). From charming technology to teaching methodology. In *Joint EAAE-ECAADE International Workshop*.

Sternberg, R. J., & Zhang, L. F. (Eds.). (2014). Perspectives on thinking, learning, and cognitive styles. Routledge.

Teymur, N. (1992). Architectural education: Issues in educational practice and policy. Question Press.

Tokman, L. Y. & Yamacli, R. (2007). Reality-based design studio in architectural education. *Journal of Architectural and Planning Research*, 245-269.

Torrey, C. (2009). How Robots Can Help: Communication Strategies that Improve Social Outcomes (Doctoral dissetation, Carnegie Mellon University. Pittsburgh). Retrieved from http://dl.acm.org/citation.cfm?id=2231207

Uluoğlu, B. (1990). Mimari tasarım eğitimi: tasarım bilgisi bağlamında stüdyo eleştirileri (Doctoral dissertation. Istanbul Technical University, Turkey).

Uluoğlu, B. (2000). Design knowledge communicated in studio critiques. *Design Studies 21* (1). 33-58.

Utaberta, N., Hassanpour, B., Handryant, A. N. & Che, A. I. (2013). Upgrading Education Architecture by Redefining Critique Session in Design Studio. *Procedia-Social and Behavioral Sciences*, *102*, 42-47.

Waks, L. J. (2001). Donald Schon's philosophy of design and design education. *International Journal of Technology and Design Education*, *11* (1), 37-51.

YOK, (May, 28 2015) YÜKSEKÖĞRETİM KURULU: 4'lük sistemdeki notların 100'lük sistemdeki karşılıkları. Retrieved from http://www.yok.gov.tr/documents/10279/31737/4_luk_sistem_100/f3d72044-c756-4302-ab26-91af35f45f43

Yürekli, H. (2007). The Design Studio: A Black Hole. Ed. Sağlamer, G., YEM-Building Inf.Center Publication, Istanbul.

APPENDIX A

A.1. Student personal information

Your name	:	
Your gender	:	Male ☐ Female ☐ Other ☐
Your age	:	
The GPA (Grade Point Average)	:	
Design Grade (Previous Semester)	:	

Please choose only one statement that usually comes close to you during critique in design studios.

1. I reflect what I hear from instructor and try to combine my ideas and instructor feedback on my design. ☐

2. I understand the instructors' feedback; however, I cannot come with an applied design. ☐

3. I am skeptical regarding the instructors' ideas about the design and I have tendency to discount the feedback I receive. ☐

4. I misunderstand the teachers' comments and apply what I want to hear. ☐

5. I remember and apply the instructors' concrete critiques. ☐

6. I assume that instructor has the same idea with my ideas. ☐

A.2. Students' degrees of agreement

Please indicate whether you agree or disagree with the following statements.

	Strongly Agree 5	**Agree 4**	**Neither agree nor disagree 3**	**Disagree 2**	**Strongly Disagree 1**
1. I have positive attitude toward **group critiques.**					
2. Interaction with my peers is higher in-**group critiques.**					
3. I learn more in-**group critiques**.					
4. I feel comfortable while asking questions in-**group critique.**					
5. Students, in-**group critiques**, ask more question.					
6. Group critiques are better for design process.					
7. Group critiques provide me with the interest of design learning.					
8. I have positive attitude toward **pin-up critiques**.					
9. Interaction with my peers is higher in-**pin-up critiques.**					
10. I feel comfortable while asking questions in **pin-up critiques.**					
11. Students, in **pin- up critiques**, ask more question.					
12. I learn more in **pin-up critiques.**					
13. Pin-up critiques provide me with the interest of design learning..					
14. I have difficulty to express my design to the instructor in **pin-up critiques**.					
15. Pin-up critiques are better for design process.					
16. I have positive attitude toward **desk critiques**.					
17. Desk critiques are helpful when same instructor gives critic each time.					
18. I learn more in **desk critiques**.					
19. I feel comfortable while asking questions in **desk critiques**.					
20. Students, in **desk critiques**, ask more question.					
21. Desk critiques are better for design process.					
22. I prefer **desk critiques** rather than group critics.					
23. I prefer **desk critiques** rather than pin-up juries.					
24. I prefer **group critiques** rather than desk critics.					
25. I prefer **pin-up** critiques rather than group critics.					

A.3. Student degrees of satisfaction

Please indicate your level of satisfaction with the following statements.

	Very Satisfy 5	Satisfied 4	Neutral 3	Dissatisfied 2	Very Dissatisfied 1
1. Your interaction with your peers' in-**group critiques**					
2. Your interaction with instructors in **group critiques**					
3. Learning experiences in **group critiques**					
4. Understanding given feedbacks in **group critiques**					
5. Available amount of time allocated for **group critiques**					
6. The way how **group critiques** are delivered					
7. Instructor's attitudes during the **group critiques**					
8. Your interaction with peers' during **pin-up critiques**					
9. Your interaction with instructors' during **pin-up critiques**					
10. Learning experiences or gaining knowledge in **pin-up critiques**					
11. Understanding the given feedbacks in **pin-up critiques**					
12. Available amount of time allocated for **pin-up critiques**					
13. The way how **pin-up critiques** are delivered					
14. Instructor's attitudes during the **pin-up critiques**					
15. Your interaction with instructor in **desk critiques**					
16. Learning experiences or gaining knowledge in **desk critiques**					
17. Understanding the given feedbacks in **desk critiques**					
18. Written feedbacks on sketches or working tools in **desk critiques**					
19. Available amount of time allocated for the **desk critiques**					
20. The way how the **desk critiques** are delivered					
21. Instructor's attitudes during the **desk critiques**					

A.4. Student experiences on critic session

Please share your ideas according to the fallowing questions.

a. What do you think if the course will be delivered online (like Moodle)?

b. What will be your suggestions for each critic types?

c. How can be critics made more effective

APPENDIX B

B.1. The Result of ANOVA for the difference between students categorization and their final grades

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.103	5	1.621	4.005	0.003
Within Groups	31.564	78	0.405		
Total	39.667	83			

B.2. The Result of ANOVA for the difference between students categorization and their GPA

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.487	5	0.297	0.807	0.548
Within Groups	28.746	78	0.369		
Total	30.233	83			

B.3. Group Statistics for the Statement 17

	Gender of students	N	Mean	Std. Deviation	Std. Error deviation
Understanding the given feedbacks in desk critique	Male	16	4.25	1.065	0.266
	Female	68	4.47	0.657	0.080

B.4. One sample T test for the difference between genders for the Statement 17

Answer of Statement 17									95% Confidence Interval of the Difference	
		F	**Sig.**	**t**	**df**	**Sig. (2-tailed)**	**Mean Differences**	**Std Error Difference**	**Lower**	**Upper**
Understanding the given feedbacks in desk critique	Equal variances assumed	2.234	0.139	-1.061	82	0.292	-0.221	0.208	-0.634	0.193
	Equal variances not assumed			-0.794	17.779	0.438	-0.221	0.278	-0.805	0.364

B.5. The result of Pearson Chi- Square test result for students attitudes towards group critique and their GPA

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	16.719[a]	20	0.671
Likelihood Ratio	19.560	20	0.486
Linear-by-Linear Association	0.006	1	0.938
N of Valid Cases	84		

24 cells (80,0%) have expected count less than 5. The minimum expected count is, 13.

B.6. The result of Pearson Chi- Square test result for students attitudes towards pin-up critique and their GPA

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.647[a]	20	0.987
Likelihood Ratio	10.260	20	0.963
Linear-by-Linear Association	0.034	1	0.853
N of Valid Cases	84		

24 cells (80,0%) have expected count less than 5. The minimum expected count is, 01.

B.7. The Result of Pearson Chi- Square test result for students attitudes towards desk critique and their GPA

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	8.851[a]	20	0.885
Likelihood Ratio	10.244	20	0.804
Linear-by-Linear Association	2.127	1	0.145
N of Valid Cases	84		

20 cells (83,3%) have expected count less than 5. The minimum expected count is,01.