

AN ANALYSIS OF PREFERENCE FORMATION IN
INTRODUCTORY DESIGN EDUCATION

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MASTER OF FINE ARTS

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September, 2001

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ABSTRACT

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Basic design education is an important experience for design students, since they are expected to construct a basis for their further education and future career, and there are several objectives in basic design education to construct this basis. Moreover, during basic design education students begin to form their preferences on visual aspects of design which will determine the quality of design product. The methodology of basic design education is based on social interaction. However, social choice theory assumes that social interaction between people will result with similar preferences of individuals, as opposite to the objectives of basic design education. Thus, the main concern of this study is to investigate probable effects of social interaction in basic design studio on preference formation of basic design students in the case of Interior Architecture and Environmental Design department of Bilkent University to open up a discussion on the relevancy of basic methodology to its objectives, and the validity of the common consents of basic design education. The results of the research show that students form similar sets of preferences because of their social interaction with instructors and their perceptual tendencies, and this manifests a situation contradicted with the objective of basic design education.

Keywords: Basic Design, Social Interaction, Preference Formation

ÖZET

TASARIM EĞİTİMİNE GİRİŞTE TERCİH OLUŞTURMA ÜZERİNE BİR ANALİZ

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Temel tasarım eğitimi, tasarım öğrencilerinin daha sonraki eğitim ve meslek yaşamları için bir temel oluşturmaları beklenen önemli bir deneyimdir. Ayrıca bu süreçte öğrenciler, tasarım ürününün niteliğinde belirleyici olan, tasarımın görsel yönüyle ilgili tercihlerini de oluşturmaya başlarlar. Temel tasarım eğitiminde yöntem sosyal etkileşime dayalıdır. Ancak, sosyal tercih kuramı temel tasarım eğitiminin hedeflediğinin aksine, sosyal etkileşimin bireylerin benzer tercihler oluşturmalarına neden olacağını savunur. Bu çalışma esas olarak temel tasarım öğrencilerinin tasarım tercihlerinin oluşmasında temel tasarım stüdyosundaki sosyal etkileşimin olası etkilerini araştırmaktır. Bu anlamda Bilkent Üniversitesi İç Mimarlık ve Çevre Tasarımı bölümü, temel tasarım öğrenci ve eğitimcilerinin tasarımın görsel yönüyle ilgili tercihleri incelenmiş ve irdelenmiş, tasarım eğitimine girişte izlenen yöntemin temel tasarımın diğer hedefleriyle tutarlılığı ve temel tasarım eğitimi ile ilgili olarak oluşturulmuş bir takım ortak kanıların geçerliliğini tartışmaya açmak amaçlanmıştır. Araştırma sonuçları, öğrencilerin eğitimcilerle girdikleri sosyal etkileşim ve algılama eğilimlerinden dolayı benzer tercihler oluşturduklarını ve temel tasarım eğitiminin hedeflediği ile çelişkili bir durumun olduğunu göstermektedir.

Anahtar Sözcükler: Temel Tasarım, Sosyal Etkileşim, Tercih Oluşturma

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1. INTRODUCTION

Design education is frequently discussed in different contents and contexts. Basic design education is a specific subject of interest as it is the introductory course of design education. The role of basic design education is critical for students' further design education and professional practice. Since design students are expected to construct a basis for their further design education, and their future careers (Farivarsadri, 1998, 1,2).

Because designers are expected to conclude the design process with a design product which is called as creative-distinguished (Lang, 1988, 614) and requires personal sets of preferences of designer (Farivarsadri, 1998, 3). Students are expected to form a basis about their preferences during basic design education. The common consent of basic design educators claims that the constructivist method of basic design education which is based on social interaction with instructors and other students will result in personal sets of preferences among basic design students. Although, there are several alternative applications and approaches for introducing design, this method of basic design education still seems to be a tradition for introducing design (Wong, 1972, iii).

On the other hand, social choice theory which specifically deals with the impact of social interaction on preference formation assumes that the preferences of individuals are formed either by authority or by society. This assumption can be deduced as basic design students form similar sets of preferences with their instructor or other students during social interaction in design studio.

1.1.THE AIM, SIGNIFICANCE AND SCOPE OF STUDY

An investigation on the effect of basic design education on preference formation during basic design will therefore be found valuable. Specifically the characteristic of the preference sets about the content of basic design education, the existence and the characteristic of the effect of the social interaction with instructors and other students on the formation of these sets, and the dominant source(s) of effect on this formation need to be examined, in relation to the assumptions of basic design education and social choice theory. Thus, this study has been conducted in order to provide data for the reconsideration of the approach of basic design education and its objectives, and to open up a discussion on the relevancy of the method of basic design education to its other objectives. The research is limited to an examination on preference formation in basic design education with an empirical study with the students of Bilkent University Interior Architecture and Environmental Design department.

1.2.THE STRUCTURE OF THE STUDY

Following this introduction, the second chapter generally deals with the preference formation on visual aspects of basic design education. The problems, process, and solutions of design activity are examined to explain the role and the importance of preferences for design activity, and the method of basic design education with its historical and psychological background is reviewed. Then, the ways and the subjects of the social interaction in basic design education are investigated under the light of the social choice theory. Finally, the content of basic design education is explained in the second chapter.

In the third chapter, the original study is introduced and data gathered on the existence and source of the effect on students' preferences, and the awareness of the subjects to the effect of others on their preferences is analyzed. The concluding chapter synthesizes the results of the empirical study on the characteristics of the preference sets, and discusses the impact of the social interaction on preference formation, and summarizes them in relation to the social choice theory.

2. PREFERENCE FORMATION IN BASIC DESIGN EDUCATION

2.1 BASIC DESIGN EDUCATION AND DESIGN ACTIVITY

The concept of design is an argumentative subject, even its meaning is a subject of discussion, because the word “design” is given different meanings by different groups of people. “Design” has become one of those words having such a wide range of reference that we are no longer certain exactly what it means. In different contexts the word “design” can represent so many varied situations that the underlying processes appear to share little in common. How is it that an engineer may be said to design a new gearbox for a car while a fashion designer may also be said to design a new dress (Lawson ,1990, 2). This point has been argued by Buchanan (1995) as follows:

No single definition of design, or branches of professionalized practice such as industrial or graphic design, adequately covers the diversity of ideas and methods gathered together under the label (3).

Even its usage as a noun and a verb show differences in meaning. When it is used as a noun, it refers to the end product; and when it is used as a verb, it refers to the activity. Also, design activity is perceived differently by specific groups of people, but there are two main paradigms for describing design as an activity (Dorst, 1996, 261-274).

These paradigms are those which define design as a problem-solving activity that is based on a positivistic philosophy and as a process of reflection in action which is based on a normative philosophy (Schön in Ochsner 2000), whereas the ideological

basis of the method of basic design education was positivistic philosophy which suggests a linear model for design (Mazumdar,1993).

To understand the relationship between design activity and this linear model, the model should be carefully examined. In this model, the design activity is seen as a rational search process that can be divided into a number of phases (Moore et.al., 1985, 6) which are the following:

- i. Recognizing and defining the problem.
- ii. Gathering information.
- iii. Forming alternative solutions.
- iv. Testing alternative solutions.
- v. Evaluation of the test and decision on implemented solution.

The idea behind this model is that it consists of a sequence of distinct and identifiable activities which occur in some predictable and identifiable logical order. Although, logically it seems that a number of things should be done in order to progress from the first stages of getting a problem to the final stages of defining a solution in a design activity, this does not seem to be a relevant way of analysing design process, because of the nature of the design process.

2.1.1. The Design Process

It seems likely that design is a process in which problem and solution occur together. In other words, the problem may not even be fully understood without some acceptable solution to illustrate it. It is never possible to be sure when all aspects of

the problem have emerged until some attempt has been made at generating solutions, and it is central to modern thinking about design that problems and solutions are seen as emerging together, rather than one following logically upon the other (Lawson, 2000, 103) .

Accordingly, the model for problem-solving activity does not correspond to the design activity. The process is not a linear process that is suggested by the model of problem-solving activity, but a cyclical process in which problem and solution become clearer as the process goes on, so many features of design problems may never be fully uncovered and made explicit (Lawson, 2000, 89).

Secondly, any assessment of the creativity of a product is exactly subjective and there is no reliable scale of the creativity of things or ideas. It is generally accepted that design is a creative occupation and that good designers are themselves creative people, and certainly we often describe their work as creative (Lawson, 1990, 108). Design is seen as a creative process in basic design education, because originality, and intuitive creativity is seen to be the most important factors in design (Stanton, 1993, 217). But creativity also requires some intellectual work, in other words, to develop new problems to be solved requires real concentration and logical thought (Zelanski and Fisher, 1996, 29).

This is why even though, design is seen as a problem-solving activity, it cannot be simply an intellectual process (Zelanski and Fisher, 1996, 29), and it is not a casual and simple process (Evans and Dumensil,1982, 8). In other words, design is much

more than mere problem solving (Rowe, 1987, 37), and it is related with the nature of design problems and solutions.

2.1.2. Design Problems

A problem can be defined as something that is wanted by an organism but the actions necessary to obtain it are not immediately obvious (Thorndike in Rowe, 1987, 39). There are basically two types of problems which are well defined problems and ill-defined problems (Rowe 1987, 39).

Well defined problems are those for which the ends, or goals, are already prescribed and apparent; their solution requires the provision of appropriate means. For ill-defined problems, on the other hand, both the ends and the means of solution are unknown at the outset of the problem-solving exercise, at least in their entirety (Newel et.al., cited in Rowe 1987, 40).

In addition to this, Churchman defines another category of problems which are so ill-defined that are known as wicked problems (cited in Rowe 1987, 41). According to the definition of Churchman, these are problems without a definitive formulation, or indeed the very possibility of becoming fully defined, so additional questions can always be asked, leading to the continual reformulation. Secondly, there are problems with no explicit basis for the termination of a problem-solving activity-no stopping rule. Any time a solution is proposed, it can, at least to some significant extent, be developed still further. Thirdly, differing formulations of the problems of this class imply differing solutions, and vice versa. In other words, the problem's formulation depends on a preconception that, in turn, implies a definite direction

toward the problem's solution. Finally, solutions that are proposed are not necessarily correct or incorrect. Plausible alternative solutions can always be provided. This characteristic follows logically from the first property that is the impossibility of a definitive formulation (Rowe 1987, 41). In other words, Rittel (in Buchanan, 1995, 14) defines ten properties of wicked problems as follows:

- i. These problems have no definitive formulation, but every formulation of a wicked problem corresponds to the formulation of a solution.
- ii. Wicked problems have no stopping rules.
- iii. Solutions to wicked problems can not be true or false, only good or bad.
- iv. In solving wicked problems there is no exhaustive list of admissible operations.
- v. For every wicked problem there is always more than one possible explanation, with explanations depending on the intellectual perspective of the designer.
- vi. Every wicked problem is a symptom of another, "higher level", problem.
- vii. No formulation and solution of a wicked problem has a definitive test.
- viii. Solving a wicked problem is a "one shot" operation, with no room for trial and error.
- ix. Every wicked problem is unique.
- x. The wicked problem solver has no right to be wrong-they are fully responsible for their actions.

In addition to this, design problems do not have certain descriptions, so design problems can be a subcategory of the wicked problems.

2.1.3. Design Solutions

Since design problems do not have a certain description, an inexhaustible number of different solutions can be produced about a design problem, so designers from different fields could suggest different solutions to the same problem of what to do (Lawson, 2000, 88).

In this sense design solutions remain a matter of subjective interpretation (Lawson, 2000, 92). because, what may seem important to one may not seem as important as to others, so there is no entirely objective formulations of design problems. Questions about which are the most important problems, and which solutions most successfully resolve those problems are often value laden (Lawson, 2000, 98). Therefore, any answer to such questions, which designers must give, are therefore frequently subjective, because, designers do not aim to deal with questions of what is, how and why but, rather, with what might be, could be should be etc. Thus, the designer is the person who is expected to put an end to the design process with a solution, because the design process can not have a finite and identifiable end (Lawson, 2000, 92). This mission of the designer to put an end to the design process with his solution makes his preferences important, because these preferences help him to produce distinguished products-creative solutions of design which is the expectation from design activity as it was stated above (Lang, 1988, 614). Consequently, what the preference is and how it is formed are important in terms of design activity.

2.2. PREFERENCES AND PREFERENCE FORMATION

Although, several explanations are made on what preference is, the concept of preference has been used to refer to several different objects, including mental satisfaction, desires, choices, and values which are often made inconsequential by the

assumption that the different senses yield the same ranking (Sen, 1996, 17). There are basically two contrasting views (Kaplan, 1982, 56).

The first view sees preference as an indicator of aesthetic judgement and focuses on stimulus properties, while the second view gives importance to decision making and choice, because preference judgement requires complex calculations assumed to be involved in any process of choosing among alternatives. However, both of them seem to be valid in a manner, because preferences are the outcome of a far more complex interaction between cognition and affect (Kaplan, 1982, 57). In addition to this, preferences are not the product of rational calculation, because they are often made so rapidly that they do not follow conscious thought. In other words, preference is not independent from cognition, because categorization, assumption, and inference occur during this process but in a manner awareness, and consciousness are not a necessary condition for this process, so it is an argumentative subject. Naturally several theories have been developed to explain the formation process of preference. Eventhough, there are several theories to explain the process of preference formation, basically there are two approaches. In the first one, the formation of preference is based on heteronomous events, and in the second one, it is based on autonomous events, as the source out of which the process is governed. Autonomy is “self-government” and heteronomy is “government from outside” (Angyal in Heider, 1958, 165). In other words, the major discussion point of these theories is the source of impact, whether the person or the society governs the process of preference formation.

In design education; an important aspect is the impact of social interaction on preferences formation because what makes studio teaching different from theoretical courses is that the method of instruction is based on a set of social interactions rather than on a one way transmission of knowledge from instructors to students (Farivarsadri, 1998, 77). Similarly in basic design education, the important aspect is the impact of social interaction on preference formation, because as a result of this educational approach, students are expected to form their own set of values and preferences that are effective for their future educational and professional life (Farivarsadri, 1998, 5-6). Therefore, the examination of this method of instruction and its historical and theoretical background gains importance.

2.2.1 Method of Basic Design Education

Although there are several criticisms about the inefficiency of its method specifically on the emphasis on master-apprentice model which is still dominant in design education (Rapoport, 1979, 100-103), due to the existence of subjectivity and lack of objective criteria in its teaching, the main method of basic design education is still studio teaching in almost all universities in the world (Farivarsadri, 1998, 56). To understand the reason behind this specific approach its historical origins and theoretical background should be examined.

Not only the content of basic design education, but also its method has originated from the Bauhaus. Itten who was the first person responsible for the program of *Vorkurs* (preliminary course, basic design) in the Bauhaus school used the method that was derived from Cizek who had developed a unique system of instruction based on stimulating individual creativity was impressed by new theories of education

about “learning-through-doing” (Cappleman and Jordan, 1993, 7). This belief was that experiment is the healthiest way to gain knowledge and a student may learn only while engaging in a real production process with a trial and error method (Gropius in Moholy-Nagy, 1947, 20). So students were expected to learn while working in the workshops, and in this way they were expected to be free from any convention and to develop their creativity and personal expression and find a way of approach to problems rather than to gain some skill and ability (Farivarsadri, 1998, 26).

As a result, Itten regarded the *Vorkurs* as a spiritual rebirth, because it was the place where students would free themselves from the preconceptions and come to a child-like state from which their innate abilities could be developed. This shift from the passive listener of a one way inculcation to the active participant of a social interaction was a radical shift in architectural education which affected design education for many years (Crinson and Lubbock, 1994, 93).

Although, there are several approaches about the psychology of education, basically, two educational approaches can be dealt with in relation to the above discussion.

These are the behaviorist and the constructivist approach. Behaviorism, which predominated education for the first half of this century, emphasized the importance of observable, external events on learning and the role of reinforcers-teachers- in influencing those events. Eggen and Kauchak (1998) state that:

The goal of behaviorist research was to determine how external instructional manipulations affected changes in student behavior. The role of the teacher was to control the environment through stimuli in the form of cues and reinforcement for appropriate behavior. Students were viewed as empty receptacles, responding passively to stimuli from the teacher and the classroom environment.(8)

On the other hand, constructivism, which is based on cognitive psychology, has focused on the central role of learners in creating or constructing new knowledge, instead of traditional behaviorist teacher-centered education. In constructivism, learners become active meaning makers. To facilitate the process, teachers design learning situations in which learners can work with others on meaningful learning tasks. The major idea of constructivist approach is based on the centrality of the students in learning process, in this way their encouragement towards thinking about their own learning is expected (Eggen and Kauchak, 1998, 11). Thus, this is a shift from the traditional teacher-centered instruction toward a more learner-centered instruction (Alexander and Murphy, 1994, 963). Learners are expected to construct understandings that make sense to them based on their experiences, rather than having them in already organized form. Learning activities based on constructivism put learners in active roles, help them to build new understanding in the context of what they already know, and apply this understanding to authentic situations. Direct experience, interaction between teachers and students, and interaction between students are important components of constructivist instruction (Good and Brophy, 1997, 5). Therefore, basic design education can be classified as a subordinate of constructivism, so the key components of constructivism are also valid for basic design education. The key components of constructivism which are agreed upon by the most of the constructivists (Good and Brophy, 1997) have been formulated by Eggen and Kauchak (1997, 186-188) as follows:

- i. Learners Constructing Understanding: The basic tenet of constructivism is the idea that learners develop their own understanding, and they develop understanding that makes sense to them; they do not “receive” it from teachers or written materials. This process of individual meaning-making is at

the core of constructivism. Nevertheless, the teacher plays an important role in the process.

- ii. **New Learning Dependent on Current Understanding:** The importance of learners' background knowledge is both intuitively sensible and well documented by research (Bruning and Schraw, 1995) Constructivists see new learning interpreted in the context of current understanding, not first as isolated information that is later related to existing knowledge.
- iii. **Learning Facilitated by Social Interaction:** Social interaction in constructivist lessons encourages students to verbalize their thinking and refine their understanding by comparing them with those of others.
- iv. **Authentic Task Promoting Learning:** An authentic task, which is a classroom learning activity that requires understanding similar to thinking encountered in situations outside the classroom.

With the help of these key components, the implications below are expected to increase student's motivation (Eggen and Kauchak, 1998,185)

- i. Students are faced with a question that serves as a focus for the lesson.
- ii. Students are active, both in their groups and in the whole-class discussions.
- iii. Students are given autonomy and control to work on their own.
- iv. Students develop understandings that make sense to them.
- v. Students acquire understandings that can be applied in the everyday world.

And this idea is based on the major statements of constructivism in relation to the learning-centered psychological principles of American Psychological Association (Eggen and Kauchak, 1998, 10), and these statements are explained as follows:

- i. Students' prior knowledge influences learning.
- ii. Students' need to think about their own learning strategies.
- iii. Motivation has a powerful effect on learning.
- iv. Development and individual differences influence learning.
- v. The classroom's social context influences learning.

Accordingly, the method of past educational experiences (secondary education) of students can be classified as a subordinate of the behaviorist approach, and the method of basic design education can be classified as a subordinate of constructivism, because firstly the method of basic design education is based on a student-centered approach in which self-transformation or self-education is important, and in this way, education is removed from the world of 'training' into one of 'learning' (Wall and Daniel, 1993, 99). This enables students and instructors to engage in education collaboratively in which social interaction is one of the key component. Thus, this makes the impact of social interaction on formation of design preferences in basic design studio valuable for discussion.

2.2.2. Preference Formation in Design Studio and Social Choice

Theory

It is apparent that the impact of social interaction in forming preferences is vital, because much of the human behavior is governed by culture – the system of shared attitudes and symbols that characterizes a group of people (Lang, 1996, 23). It can even control our thinking to some degree, for it is uncomfortable to think thoughts not approved by one's culture. In other words, through its culture, society controls

the behavior of individuals, because the culture of people is a shared schema which can be seen as the manners, morals, customs, and beliefs of the culture (Moore et.al., 1985, 389) which designate regularities in a group's thinking and behavior (Lang, 1996, 23). In order to be socialized into a culture, an individual should have the ability to know that appropriate behavior is the price of receiving tremendous advantages that are provided by society (Moore et.al., 1985, 390). This is the focus that social choice theory specifically deals with.

In social choice theory, the basic assumption is that the social interactions are effective in making individual preferences (Sen, 1996, 23), and that there are two ways of preference formation in social choice theory. In the first one, an authority defines a set of preferences for individuals, and for the cases that the authority does not define any norm, collective decision happens in the society to form these individual preferences (Coleman, 1986, 96). In other words, whoever defines the norms for forming preferences has the power in social choice theory. Kelly (1987) defines this concept, in relation to social choice theory, as follows:

The concept of power is the decisiveness of power to exclude alternatives from chosen sets. It is a property of many social choice procedures that exclusionary power is assigned to just single individuals or to coalitions of less than all individuals (88).

Although only the goals that are private in nature do not require the consideration of other individuals for their contemplation and enjoyment have intrinsic value to an individual, the private goals should be in harmony with the socially defined goals, because an individual can not attain his private goals without socially defined goals which are used as stepping-stones to private goals. As long as socially defined goals

such as fame, honor, and power derive their meaning and value only in the context of a social collectivity, notoriety and esteem necessitate the adulation or respect of an audience. Therefore, power requires that there be subjects to be persuaded, influenced, ruled over, or dominated. Fame, honor, power, and other socially defined goals can not be contemplated without reference to more than a single individual. In other words, socially defined goals, under the assumption of the social choice model, have value only to the extent that they are instrumentally valuable for the attainment of intrinsic goals (Chong, 1991, 2). This is why a society can exist at all, despite the fact that individuals are born into it wholly self-concerned, thus this situation gives the authority to decide on norms by which individuals are largely governed (Coleman, 1986, 16).

These norms are acquired directly or indirectly from the culture in an unconscious manner (Lang, 1996, 23). Therefore, these propositions may never be questioned by the person accepting them. In other words, the individual hears and observes from other people, and simply adopts them without examining them critically or seeking evidence to support them (Moore et.al., 1985,32).

This holds for any kind of culture, naturally for the professional culture of designers (Lang, 1996, 23). This means that the professional culture of designers puts its own norms for designers, whereas designers have attempted to influence cultures through the product they design, and their ability to do so depends on the architect's ability to convince the symbolic meaning of new architectural forms that are produced by the others (Lang, 1996, 23).

That is to say, professional culture forces them to behave according to their norms, and they are unaware of it. At the same time, they are expected to create new symbols for society, and that is not possible if they behave in harmony with the norms of the professional culture. Therefore, the influence of them on designers can not be ignored, whereas one of the factors that distinguishes the work of one architect from another is the degree to which he or she deviates from standard professional ideology, in addressing problems, and developing patterns to solve them (Lang, 1988, 614).

Similar to professional culture, the educational culture is also influential on preference formation, because society influences individual choices of preferences indirectly by education (Moore et.al., 1985, 33). In other words, culture is the common order, and the development of culture is based upon information and education and therefore depends on the existence of common symbol-systems. Participation in a culture means that one knows how to use its common symbols. Culture integrates the single personality in an ordered world based upon meaningful interactions (Norberg-Schulz, 1988, 20), That is to say, all forms of education not only transmit knowledge and skills but also inculcate some sort of embodied culture, which exists within the individuals, as attitudes, tastes, preferences and behaviors (Bourdieu cited in Stevens, 1995, 106), or habitus, in addition to this a set of internalized dispositions that inclined people to act and react in certain ways and from which perceptions, attitudes, and practices are generated (Farivarsadri, 1998, 60), because in social groups people share a certain set of attitudes, tastes, and dispositions (Farivarsadri, 1998, 59).

In the case of basic design, the design studio has encouraged a subculture all its own, a different world with its own values and behaviors (Anthony, 1991, 38). As long as all sorts of education not only transmit knowledge and skills, they also socialize students into some sort of ethos and culture (Stevens, 1995, 105-122). Naturally, design education socializes students into some sort of ethos and culture. Thus, the impact of social interaction should play an important role for preference formation in basic design education, according to the assumptions of social choice theory. This is important because, introductory design education is not only important for architectural education, but also for architectural practice. This means that students are supposed to learn in this year can be assumed to be fundamental in architectural design (Farivarsadri, 1998, 1,2), because in basic design studios, students develop a set of values and attitudes which will last during their educational practice and even throughout their whole professional life (Farivarsadri, 1998, 39).

In an architectural education which tends to address the whole person and aims at helping students to improve themselves in different directions and develop their own value set of values and judgement criteria, the design studio teaching should have a conceptual and systematic basis which allows the obtaining of the mentioned goals (Farivarsadri, 1998, 114) Nevertheless, it is argumentative that basic design has such a conceptual and systematic basis that allows obtaining the mentioned goals, because studio education is carried on in an accidental manner (İnceoğlu, 1994, 23). As long as the impact of social interaction on the formation of student's design preferences is critical in basic design education as the means of interaction, the nature of the students and the role of the instructors of the basic design studio can be seen as important to affect design preferences.

2.2.2.1.Ways of Interaction in Design Studio

The studio medium provides several ways of social interaction between instructors and students, influencing the direction of the discussion in these social interactions which are both formal and informal. Formal social interactions are individual, group, and public critiques which have always been the core of educational activity in the studio (Uluoğlu, 1990, 37), and informal social interactions are the interactions between students in design studio. Thus, both of these interactions are expected to be effective on the preference formation of students due to the social choice theory.

2.2.2.1.1.Formal Interactions

2.2.2.1.1.1.Individual and Group Studio Critiques

Studio critiques, individually or in group, are the main tools in design instruction. In this process student receives feedback about his/her design work and accordingly tries to improve it (Farivarsadri 1998, 135). In this interaction, the role of students seems to be primary while the role of the teacher appears secondary. In basic design education (Farivarsadri, 1998, 136), the instructors are to give guidance to the student rather than to produce solutions, thereby implying that instructors are secondary. However in reality, this can be a subject of argumentation. The difference between the group critiques and the individual critiques is the other source of impact on students' preference formation. Group critiques can make students participate in the instruction process more actively and also let them see as many alternatives to the same problem which makes them aware that there is no single solution for a design problem. They can also hear different criticisms from different points of view about many subjects that may not be present in their own works (Farivarsadri, 1998, 136-137).

2.2.2.1.1.2.The Juries: Public Critiques

Juries in design education are seen as a continuation of the critiques carried on in the studio. The difference is that it is a public critique (Farivarsadri, 1998, 137). The origins of the jury system can be traced to the Beaux-Arts school. These student's works were evaluated behind closed doors by a jury and the grades were announced to the students with little or no comment, as in other architectural schools until the 1940s and 1950s. Then these juries changed from a closed to an open format (Anthony 1991). This change in the format, from closed to open, makes it public. This way of social interaction is especially important because the assessment of design works is a very important part of design education. A process of assessment derived from clear learning objectives is necessary for the overall success of instruction. Generally in design studios the summative evaluation is done through juries (Farivarsadri, 1998, 135), and this interaction makes students open to the effect of, not only his/her instructor, but also the other instructors and professionals.

2.2.2.1.2. Informal Interaction: Interaction between Students

Another important set of interactions are informal social interactions among students. These interactions are important because students not only criticize each other's designs in group discussions but also informally discuss their friends' and their own works. It has been observed that these informal discussions are very effective in introductory design education (Farivarsadri, 1998, 78). This can be why the outcome of instructors' interpretations of the student's work reveals something they never intended to communicate to student (Uluoğlu, 1990, 37). In other words, students

form some attitudes and preferences during the studio experimentation that instructors can not reason.

2.2.2.2. Subjects of Basic Design Education

The impact of social interaction on the preference formation about design aspects makes the role and the characteristics of the subjects who are students and instructors, because the direction of this social interaction is manipulated by these subjects.

2.2.2.2.1. Students

Although, the nature of the students is affected by several variables such as cultural context of the period of time (Wall and Daniel, 1993, 100), in Turkey's case the most important variable is their past educational experiences, namely, their secondary education. The characteristics of secondary education are defined by Aytaç-Dural (1999) as follows:

- i. It is structured on memory based teaching and learning system.
- ii. The instincts of the student are suppressed.
- iii. The system is based on lecturing- the direct transfer of ready knowledge.
- iv. The system is based on the absolute dependence on the authority.

Thus, students are used to accepting every word the teacher says as the absolute truth and this result with the total obedience of authority. As a consequence of this, most of the students are inclined to memorize what they hear like a parrot, and fail to question what they are instructed (Aytaç-Dural, 1999, 24).

For this reason the effects of the past experiences which suggest a teacher-centered approach, the students may not be aware and naturally will not adapt the student-centered approach. Also this is because of the expectations from them that their secondary education is the repetition of the transmitted knowledge. However, in basic design education they are expected to create concrete products rather than the repeat of transmitted knowledge. This situation is defined as an important characteristic of architectural education, which makes the students feel insecure and uncomfortable. Since they hesitate to produce, thinking that they are not given sufficient data, they can not actively participate in the course; and they even do not have the courage to question this system of learning at the very beginning stages. Therefore, students will have a tendency to form preferences that are gained from their instructor(s) or from other student(s) in an implicit or explicit unconscious manner instead of their own preferences (Aytaç-Dural, 1999, 24).

This is the nature of beginning students who are just in the first step of their educational journey to become architects, and this makes a careful pedagogical approach to the organization of the course even more crucial (Farivarsadri, 1998, 2). Most interestingly, secondary education, in no way, prepares students for a field such as architecture in which independent, creative and visually sensitive people are needed (Farivarsadri,1998,2), whereas there is almost no room for the quick minded visually sensitive young student in the secondary education system. The system denies the independent, courageous, original, sensitive, temperamental, ego-centric mind, although it should be obvious that the future of the profession depends immensely upon the contributions that such men can make (Denel, 1979, 4).

2.2.2.2.2 Instructors

The educational method of basic design education which is based on social interaction has changed the role of instructors, noting that this change is important because the beginning students are different and special. While approaching them, the instructor should offer support and encouragement and should respond to each project in a manner appropriate for that student and project (Farivarsadri, 1998, 77). Sprinthall and Sprinthall (1977) have defined three important set of attitudes in relation to the role of instructors role in teaching as follows:

- i. attitudes toward learning
- ii. attitude toward students
- iii. attitude toward self

On the other hand, the instructors of introductory design education do not have a pedagogic formation and their knowledge about the method of basic design education is based only on their past educational experiences with their studio masters- in the master-apprentice system- unaware of the application of the basic design education in relation to its objectives. As students have some previous experiences that can prevent their conscious formation of preference, also instructors of basic design education may have problems to adapt to a student-centered education. So the role of the instructor in basic design education is different than a master which is based on a teacher-centered approach because it is a vocation which demands a selfless approach to helping the individual to think and see in new ways, while valuing each individual's heritage (Kalogeras and Malecha, 1994, 30). This makes the mode of inculcation important for basic design education. There are two

kinds of inculcation modes which are scholastic and charismatic modes. The scholastic mode is what we normally recognize as pedagogy, the formal and explicit teaching of formal and explicit knowledge and skills; and the charismatic mode is the informal and implicit method of inculcation (Bourdieu cited in Stevens 1995, 117).

The design studio is a very suitable environment for the operation of a charismatic mode of inculcation (Farivarsadri, 1998, 60). For this reason, the hidden agenda in design studios should be discussed. Both of the modes have an agenda above and beyond what most instructors announce as the basic content of the course. Teaching this “hidden agenda” involves transmitting to students the basic value systems and ethics of a profession-with the faculty as the ultimate role models. Several scholars have called this hidden agenda the “hidden curriculum”: the values, virtues, and desirable ways of behaving that are communicated in subtle ways in every field. The hidden curriculum can often be more powerful than the actual content and substantive information conveyed in the classroom. This means that, this hidden curriculum forces students to adapt themselves to their critics-instructors. Students learn that design is first and foremost an artistic endeavor, and that their chances for success are better if they can please their critics (Anthony, 1991, 12).

In addition to this, for the remaining ones who do not adapt themselves a negative evaluation will result during the critiques, because of referring to design instructors and jurors as critics, both the words criticism and critic primarily connote a negative evaluation. The strong emphasis one can make the new students’ introduction to design education all that much harder to take (Anthony, 1991, 13). As a result, the role of instructors is critical to provide an environment for maximum growth of

students with different characteristics and experiences rather than trying to create a homogeneous mass (McGinty, 1993, 2).

2.2.3. Content of the Introductory Design Education

The approach to the content of basic design education, which is still very effective in Turkey, emphasizes the visual aspects of architectural design and aims at teaching the fundamentals of visual organization, shared by all fields working in the visual domain including architecture (Bayındır, 1994), because it takes its theoretical background from the program of Bauhaus which emphasizes the visual aspects of design activity (Norberg-Schulz, 1988).

This approach has been criticized by several schools, and the first announcer of this criticism was the Ulm school. The criticism was that the Bauhaus tradition was unable to adapt the individual to the real object world of the society, and lead to a new formalism (Norberg-Schulz, 1988). Because architectural design is a social activity, it was claimed, there are many intrinsic factors which affect the decisions of the designer. The concerns of architecture should go much further than the mere organization of shapes and forms, because the psychological and social needs of the users and their interactions with the built environment in introductory design education seems to be partly due to the difficulty of handling these matters which vary from one society to another and even between individuals, and partly because there is not always a body of knowledge about these matters ready to be used in design and design education (Farivarsadri, 1998, 65). In addition to this, teaching social sciences with all its ramifications incorporated into basic design is an impossible task. Yet, subjecting students to its forces thereby convincing them of

their importance is a must. The basic problem of that “convincing” shall be looked at in various ways of perceiving or appraising people and groups of people starting with masses to individuals (Denel, 1979, 93).

As a result, eventhough the Bauhaus has been criticized, the goals of Bauhaus are still very influential in Turkey, because, although its theoretical validity is not proved, their conceptual structure is very strong (Lang, 1998, 8). In all, the goals of this first year program in the Bauhaus are explained by Moholy-Nagy (1947) as follows:

The first year training is directed toward sensory experiences, toward the enrichment of emotional values, and toward the development of thought. The emphasis is laid, not so much on the differences between the individual, as on the integration of their common biological features, and on objective scientific and technological facts. This allows a free, unprejudiced approach to every task (19).

In addition to this, the content of the basic design education shows differences in different art and design schools (Wong, 1972, iii), but there are some commonalities in the objectives of the content of the basic design education. Farivarsadri (1998) states that:

The first objective of the content of basic design education is to involve students in the design process and make them learn to design i.e. to learn different ways of organizing and making order in the world they deal with. It is possible to use different means in obtaining this goal depending on the view about design and its fundamentals. The problems given can be two or three dimensional; may be abstract or concrete; may be done within a closed system or accept the role of external factors;but the general aim is to make organizations, or to produce a basis for organization of the elements of design (111).

Ledewitz (1985) identifies the knowledge about this basis for organization of the elements of design as a new language which is detailed by Schön (1984) as the elements, features of these elements, their relations and action with each other and

the environment that surrounds it, and norms about organization of these elements. In addition to this, Lang deals about these norms as follows:

The relevant concepts of perception to basic design are mostly from the terminology of the Gestalt psychology of perception. As Lang also points, Gestalt principles of perception had influence on principles of organization in design. Gestalt psychology deals primarily with the organizational aspects of perception and puts forward some principles according to which perceptual organization is realized (in Ulusoy, 1983, 2).

These norms are defined by Lauer and Pentak (2000), Zelanski and Fisher (1996), Arntson (1988), Wong (1972), Bevlin (1989) as design principles, but named by Chetham et.al. as design concepts, and categorized by Ching (1979) as ordering principles and organizations.

2.2.3.1.The Elements of the Introductory Design Education

There are several classifications and definitions made about the elements of design, whereas only Wong (1972) sees the point that the elements of design can be classified as (7):

- i. conceptual elements.
- ii. visual elements.

2.2.3.1.1.Conceptual Elements

These elements can not be perceived visually. Wong defines these elements as conceptual, because they do not actually exist but seem to be present (1972, 7). Dimension is the variable that determines this category of elements. They are defined by Wong as:

- i. Point
- ii. Line
- iii. Plane

- iv. Volume

2.2.3.1.2. Visual Elements

These elements can be perceived visually. Thus, when conceptual elements become visible, they have shape, size, color, and texture. Visual elements form the most prominent part of a design because they are what we can actually see (Wong, 1972, 7). Therefore, the characteristics that make the conceptual elements visible called as visual elements that are stated by Wong as (7).

- i. Shape
- ii. Color
- iii. Texture

Color and texture are explained by Schön as the features of design elements, and shape is determined by Schön as the element of design (in Lawson, 1997, 243). The features of design elements are out of the content of this study, because of the wide range that is suggested by this category that can make this study pragmatically impossible. Studies in Gestalt psychology are the major source of inspiration for introductory design education (Ulusoy, 1983, 2), thus in this study, the emphasis is made on form and its organization, and surface characteristics will ignored. This dissertation deals also with only the regular geometric shapes, because of the importance of regular geometric shapes for basic design education . Similarly, the other alternatives of shapes which are stated by Wong (1972) as geometric, organic, rectilinear, irregular, hand-drawn, accidental (9) are ignored in this study.

2.2.3.2. Relationship between Forms

Forms can be integrated in several ways, and the results can be very complex. Wong (1972) simplifies this relationship on two circles and looks at how they can be brought together. He chooses two circles of the same size to avoid unnecessary complications, and he categorizes these interrelationships under eight headings which are the following (11):

- i. Detachment: The two forms remain separate from each other although they may be very close together. In, detachment, both forms may appear equidistant from the eye, or one closer, one farther away.
- ii. Touching: If we move the two forms closer, they begin to touch. The continuous space which keeps the two forms apart in detachment is thus broken. In touching, the spatial situation of the two forms is also flexible as in detachment. Color plays an important role in determining the spatial situation.
- iii. Overlapping: If we move the two forms still closer, one crosses over the other and appears to remain above, covering a portion of the form that appears to be underneath. It is obvious that one form is in front of, or above the other.
- iv. Penetration: Same as *overlapping*, but both forms appear transparent. There is no obvious above-and-below relationship between them, and the contours of both forms remain entirely visible. In penetration, the spatial situation is a bit vague, but it is possible to bring one form above the other by manipulating the colors.
- v. Union: Same as *overlapping*, but the two forms are joined together and become a new, bigger form. Both forms lose one part of their contour when they are in union. In subtraction, as well as in penetration, we are confronted with one new form. No spatial variation is possible.

- vi. Substraction: When an invisible form crosses over a visible form, the result is subtraction. The portion of the visible form that is covered up by the invisible form becomes invisible also. Substraction may be regarded as the overlapping of a negative form on a positive form. In subtraction, as well as in penetration, we are confronted with one new form. No spatial variation is possible.
- vii. Intersection: Same as *union*, but only the portion where the two forms cross over each other is visible. A new, smaller form emerges as a result of intersection. It may not remind us of the original forms from which it is created.
- viii. Coinciding: If we move the two forms still closer, they coincide. The two circles become one (13). In coinciding, we have only one form if the two forms are identical in shape, size, and direction. If one is smaller in size or different in shape and/or direction from the other, there will not be any real coinciding, and overlapping, penetration, union, subtraction, or intersection would occur, with the possible spatial effects just mentioned.

Ching (1979) categorizes the relationship between two forms into four groups which are the following:

- 1) The two forms can subvert their individual identities and merge to create a new composite form.
- 2) One of the 2 forms can receive the other totally within its volume.
- 3) The two forms can retain their individual identities and share the interlocking portions of their volumes.

- 4) The two forms can separate and be linked by a third element that recalls the geometry of one of the original forms.

As same as Wong, he explains the differentiation in geometry and orientation between these forms as the factors that make the collusion and the interpenetration between these forms possible. In this study, center, middle and end are used as a criteria for figure-figure and figure-ground relationship, because in introductory design education, figural identity and geometrically meaningful points are desirable for integration.

2.2.3.3.Types of Organizations:

Ching (1972) defines the organizations of form as the basic ways to relate one form to another to have coherent patterns from them, and continues about ordering principles of form as the visual devices that allow the diverse forms to co-exist perceptually and conceptually within an ordered and unified whole. He represents type of organizations of forms which are centralized organizations, linear organizations, radial organizations, clustered organizations, grid- iron organizations, and he states that (205):

- 1) Centralized organizations are the organizations which consist of a number of secondary forms clustered about dominant, central parent-forms.
- 2) Linear organizations are the organizations which consist of forms arranged sequentially in a rows.
- 3) Radial organizations are compositions of linear forms that extend outward from central forms in a radial manner.
- 4) Clustered organizations are the organizations which consist of forms that are grouped together by proximity or the sharing of a common visual trait.

- 5) Grid-iron organizations are the organizations in which the forms are modular and regulated by three-dimensional grids.

Because the other organizations which can be created as the hybrids of these organizations, only the above organizations are dealt with in this study.

2.2.3.4.Design Principles

Order without diversity can result in monotony or boredom (Ching, 1979, 332). The following principles are used as visual devices that allow the diverse forms and spaces to co-exist perceptually and conceptually within an ordered and unified whole.

1. Repetition: The use of recurring patterns, and their resultant rhythms, to organize a series of like forms or spaces. (Ching, 1979, 333 and Wong, 1972, 15).
2. Axiality: A line established by two points in a space and about which forms and spaces can be arranged (Ching, 1979, 333 and Van Dyke, 1990, 33).
3. Symmetry: The balanced distribution of equivalent forms and spaces about a common line (axis) or point (center) (Ching, 1979, 333 and Cheatham et.al., 1987, 35).
4. Transformation: The principle that an architectural concept or organization can be retained, strengthened, and built upon through a series of discrete manipulations and transformations (Ching, 1979, 333). It is defined as a gradual change of shape by Wong (1972, 39) and Knight (1994, 36).
5. Hierarchy: The articulation of the importance or significance of a form or space by its size, shape, or placement, relative to the other forms and spaces of the organization (Ching, 1979, 333 and Lauer and Pentak, 2000, 60).

6. Contrast: A kind of comparison where-by differences are made clear, and it is made by emphasizing these differences (Wong, 1972, 67 and Cheatham et.al., 1987, 89).
7. Growth: This indicates the gradual change of size of the unit forms (Wong, 1972, 39 and Van Dyke, 1990, 34).
8. Rotation: The gradual change of direction of the unit forms (Zelanski and Fisher, 1996, 41 and Wong, 1972, 39).
9. Rhythm: Rhythm is based upon repetition of similar and varying elements (Zelanski Fisher, 1996, 41 and Arntson, 1988, 102).
10. Dominance: One kind of unit form which occupies more space in design than other kinds (Wong, 1972, 71 and Cheatham et.al., 1987, 95).
11. Assymetrical Balance: The equal visual weight among the elements which has contrasted characteristics (Arntson, 1988, 49 and Cheatham et.al., 1987, 39).
12. Variation: The use of varying elements, either as slight variations repeating a central theme or as strong (Zelanski and Fisher, 1996, 38 and Wong, 1972,15).

Although, alternative principles which are produced by theoreticians individually, the above principles are the ones that are referred from more than one source, so they are the principles on the validity there is an agreement on their validity as design principles of basic design education.

3. EMPIRICAL STUDY

Preferences of designers are very important for design activity to put an end to the design process with a design solution which is expected to be called as creative. Therefore, the formation of these preferences becomes very important for design activity. The role of basic design education is critical for design activity, because during basic design education students are expected to form their personal sets of preferences which are distinguished from the preferences of the others, because these preferences are required to produce creative solutions. The social interaction based method of basic design is assumed to be suitable to reach this purpose, whereas social choice theory assumes the opposite that social interaction will cause sets of preferences for students which are similar with others. These claims have been studied by means of an empirical study involving first year design students and instructors at I.A.E.D. department of Bilkent University.

3.1. AIMS OF THE EMPIRICAL STUDY

In this study, the existence and source of the effect on students' preferences, and the awareness of the subjects to the effect of others on their preferences are examined in relation to the assumptions of basic design education and social choice theory.

In relation to the assumption of basic design education, students are expected to form personal distinguished sets of preferences (Farivarsadri, 1998, 3), so instructors are expected not to affect students' preferences on design aspects. In relation to the assumptions of social choice theory, the preferences of the individuals are expected to be formed either by the authority or by the society (Coleman, 1986, 96). If this claim is deduced for this case, it can be said that either instructors or other students

are expected to affect the preferences of the students on these aspects. Therefore, the major concern of this thesis is to examine whether social interaction with instructors or other students is effective on the preferences of basic design students' on these visual aspects, and the awareness of the instructors and the students about the effect of others on their preferences, and the awareness of instructors about their effect on students preferences.

3.2. METHODOLOGY OF THE STUDY

3.2.1 Subjects:

The subjects involved in the study comprise the basic design students and the instructors of Interior Architecture and Environmental Design Department of Bilkent University. In Total, the population consists of 121 students and 8 instructors. As the volume of the population is not very large, sampling has not been realized, because the results that are gained by the way of sampling may not manifest the characteristics of the population. This study has been realized in 4 design studios with 8 sections, and each of these sections consist of 17-20 students and an instructor.

3.2.2. Questionnaire

Two different questionnaires have been prepared; one for the students (Appendices 1 and 3) and one for the instructors (Appendices 2 and 4). The questionnaire for students is prepared as the center of the concern and the questionnaire for the instructors is prepared for the examination of the independency of the preferences of students to the instructors.

Both of the questionnaires are consisted of 15 multiple choice questions that are divided into five groups in relation to the visual aspects of design. Each group of questions is classified under 3 categories.

In the questionnaire for students, the first category of questions are about students' preferences about the related aspect of design, the second category of questions are about their inferences about the similarity of their preferences to their instructor's preferences, and the third category of questions are about their inferences about the similarity of their preferences to other students' preferences.

In the questionnaire for instructors, the first category of questions are about instructors' preferences about the related aspect of design, the second category of questions are about their inferences about the similarity of their preferences to their colleagues' preferences, and the third category of questions are about their inferences about the similarity of their preferences to their students' preferences.

In addition to this, both of the questionnaires are prepared in Turkish and in English, whereas the correspondance of the terms in English is given in paranthesis, because students learn these concepts in English. The questionnaires were designed to include multiple choice questions to facilitate statistical analysis.

The Criteria for the Questionnaires is based on Gestalt psychology, since the content of basic design education has originated in Gestalt psychology, and the main criterion is the simplicity for Gestalt psychology (Arnheim, 1974, 55). Thus, the

main criterion for the questionnaire is the simplicity, too, and this criterion manifests itself in different questions with different parameters.

For the question that is related with preferences about 2-D shapes, the parameter is the equilaterality of the sides which facilitate the perception of shapes (Arnheim, 1974, 56). The spectrum of the equilateral shapes is ranked as equilateral triangle, square, polygons, and circle. From this spectrum, equilateral triangle, square, pentagon as the simplest polygon, and circle are selected for the choices.

For the questions about the students' preferences about figure-figure relationship and figure-ground relationship, the common parameters in relation to the Gestalt theory are the orthogonality of the relationships (Arnheim, 1974, 71), and geometrical identity of points (Arnheim, 1974, 13). These points are the points of integration for figure-figure relationship and point of placement for figure-ground relationship. The second parameter is the protection of the geometrical character of elements (Ulusoy, 1983, 41), therefore the relationships which are middle-middle, middle-end, end-end, and center-end are selected for the choices of the related question because the remaining alternatives that are based on the relationship between the geometrically identical points spoil the geometric character of elements. For the question about the figure-ground relationship, the points of placement are again geometrically meaningful points which are end, middle, center and semi-center are put as the choices.

For the question that is related with the type of organization, the parameter is the purity of the organization (Ching, 1972, 205). So that centralized, linear, radial,

clustered, and grid-iron organizations are put as the choices. For the question that is related with the design principles, the parameter is the collective acceptance of these principles by more than one source. Accordingly, repetition, axuality, symmetry, transformation, hierarchy, contrast, growth, rotation, rhythm, dominance, assymetrical balance, and variation are put as the choices.

3.2.3. Procedure

The questionnaire was firstly tested in a pilot study in the Landscape Architecture and Urban Design Department of Bilkent University. This pilot study was formulated in order to clarify the problems that would be faced during the emprical study. In the light of the pilot study, the main study focused on the impact of social interaction on preference formation, instead of dealing with other possible sources of impact on preference formation. Then the survey was realized in Interior Architecture and Environmental Design Department of Bilkent University with this new questionnaire. During the application of the study, two factors were taken into consideration. These factors are spontaneity of the response against the prejudices, and individuality of the response against the mutual impact in the studio.

3.3. Data Analysis and Results

The data collected from both of the questionnaires consists of 5 groups in relation to the visual aspects of design, and every group consists of 3 categories of responses. The first category of responses is about the subjects' preferences about the related aspect of design. The second category of responses are about the subjects' inferences on the similarity between the preferences of instructors and their preferences about the related aspect of design, and the third category of response is about the subjects'

inferences on the similarity between the preferences of other students and their preferences about the related aspects of design.

Firstly, to explain descriptively whether the majority of the students and instructors have common preferences on the related aspects of design, the first category of the responses of both questionnaires have been analyzed separately.

Secondly, to clarify statistically whether the instructors are affecting students' preferences on the related aspects of design, the first category of the responses have been analyzed by the Chi-Square test together. This test is found proper to examine the independence of the preferences of students from the instructors' preferences because both of them are categorical variables. The hypotheses that are examined by chi-square are defined by the common consent of basic design educators and the claim of the social choice theory. The null hypothesis that the preferences of students on the related aspects of design are independent from the instructors' preferences is defined by the common consent of basic design educators. The alternative hypothesis that the preferences of the students on the related aspects of design are not independent from the instructors' preferences is stated due to the claim of social choice theory.

Thirdly, to state descriptively whether students and instructors are aware of the effect of the instructors on their preferences, the second category questions of both questionnaires are examined. To manifest descriptively whether students are aware of the effect of the other students on their preferences, the third category of the questions of students' questionnaire are examined, and also to manifest descriptively

whether instructors are aware of their effect on students' preferences about the related aspect of the design, the third category of the questions of instructors' questionnaire are examined.

3.3.1. The Analysis of Preferences on 2-D Shapes

In this part, the responses of the students and instructors to question 1, 2, and 3 are separately analyzed. Data is obtained related to through responses; their preferences on 2-D shapes in question 1, about their inferences on the similarity of their preferences to the instructors in question 2, and to the other students in question 3. Firstly, to understand whether the students and instructors have common preferences, the responses of the students and instructors to question 1 are separately examined. The preferences of students on 2-D shapes are shown in Table 3.1.

Table 3.1 The Distribution of the Students' Priorities Determined by 2-D Shapes

| 2-D Shapes | Priority | | | | | | | Total |
|--------------|-----------|------------|------------|------------|-----------|----------|----------|------------|
| | None | 1 | 2 | 3 | 4 | 5 | 6 | |
| Triangle | 13 | 11 | 38 | 44 | 11 | | | 117 |
| Square | 5 | 76 | 20 | 12 | 1 | 1 | 1 | 116 |
| Pentagon | 70 | 4 | 6 | 12 | 22 | 2 | | 116 |
| Circle | 7 | 18 | 42 | 37 | 9 | 1 | | 114 |
| Other | 3 | 6 | 4 | 1 | 6 | 4 | | 24 |
| Total | 98 | 115 | 110 | 106 | 49 | 8 | 1 | 487 |

In Table 3.1, the common preferences of the majority of the students on 2-D shapes are observed. They mostly prefer square (66%) and not prefer pentagon (71%) as a 2-D shape. The preferences of instructors on 2-D shapes are shown in Table 3.2.

Table 3.2 The Distribution of the Instructors' Priorities Determined by 2-D Shapes

| 2-D Shapes | Priority | | | | | | | Total |
|--------------|----------|-----------|----------|----------|----------|----------|----------|-----------|
| | None | 1 | 2 | 3 | 4 | 5 | 6 | |
| Triangle | 1 | | 2 | 1 | 3 | | | 7 |
| Square | | 7 | 2 | | | | | 8 |
| Pentagon | 5 | | | 1 | 1 | 1 | | 8 |
| Circle | | 1 | 2 | 5 | | | | 9 |
| Other | | | 2 | 1 | | | | 5 |
| Total | 6 | 10 | 8 | 8 | 4 | 1 | 0 | 37 |

The distribution of instructors' preferences shows that the instructors' majority have a common preference as square (60%) and do not prefer at all pentagon (83%) in 2-D shapes.

Comparison of the Preferences of the Students and Instructors on 2-D Shapes

Although, the students and instructors have stated their common preferences independently; to clarify whether the instructors are affecting the formation of the preferences of students or not, their preferences are examined together. The examination focuses on the similarity of their first preferences and not preferring cases in general and then the similarity of the students' first preferences to their own instructors for each section. The distribution of the students' and instructors' first preferences and not preferring cases on 2-D shapes is shown in Table 3.3.

Table 3.3 The Distribution of 2-D Shape Preferences of the Students and Instructors

| 2-D Shapes | | Students' Preference | Instructors' Preference |
|------------------|----------|----------------------|-------------------------|
| First Preference | Triangle | 11 | 0 |
| | Square | 76 | 7 |
| | Pentagon | 4 | 0 |
| | Circle | 18 | 1 |
| | Other | 6 | 0 |
| Not Preferred | Triangle | 13 | 1 |
| | Square | 5 | 0 |
| | Pentagon | 70 | 5 |
| | Circle | 7 | 0 |
| | Other | 3 | 0 |

Table 3.3 shows that the preferences of the majority of the students and the instructors are similar. However, this does not assure that instructors are not affecting students in forming these common preferences, unless a statistical analysis has been done simultaneously on the preferences of the instructors and students. Since there is a possibility of the dependency of the students' preferences on the instructors' preferences in relation to their social interaction in the design studio, as well as to the other students, the instructors' and students' common preference on square and common dislike on pentagon can be a sign of the effect of instructors on all the students. Thus, to clarify whether the students or instructors are the source of effect on common preference of students, the common consent of basic design educators and the claim of social choice theory are used for testing.

The common consent of basic design educators, that students are expected to form a distinguished set of preferences on the visual aspects of design is deduced into the

null hypothesis that students' preferences on 2-D shapes are independent of the preferences of instructors.

The claim of social choice theory that the preferences of the individual are formed either by authority or other members of the society in general is turned into the alternative hypothesis that students' preferences about 2-D shapes are dependent on the preferences of the instructors or other students. The relationship between the students and instructors preferences on 2-D shapes is displayed in Table 3.4.

Table 3.4 The Relationship between Students and Instructors Preferences on 2-D Shapes

| Instructors | First Preference | Students' Preference | | Total |
|-------------|------------------|----------------------|-------------|-------|
| | | Similar | Not Similar | |
| 1 | Square | 10 | 8 | 18 |
| 2 | Square | 6 | 8 | 14 |
| 3 | Other | 8 | 8 | 16 |
| 4 | Circle | 2 | 15 | 17 |
| 5 | Square | 11 | 5 | 16 |
| 6 | Square | 6 | 3 | 9 |
| 7 | Square | 15 | 2 | 17 |
| 8 | Square | 11 | 3 | 14 |
| Total | | 61 | 60 | 121 |

After the application of Chi-Square test, it is concluded that ($\chi^2 = 26.34$, $df = 7$, $P < 0.0005$) the students' preferences are not independent of the preferences of the instructors on 2-D shapes. This can be interpreted as the effect of instructors on students' 2-D shape preference, and the reason of the common preferences among students.

Inferences of the Students and Instructors between and among them

After the analysis on the preferences, the responses about the inferences are investigated to understand the students' and instructors' level of awareness related to the effect of others on their own preferences. The distribution of students' and instructors' inferences whether similar or not on the preferences of students and instructors on 2-D shapes is shown in Table 3.5.

Table 3.5 Distribution of Subjects' Inferences on the Preference of Instructors and Students on 2-D Shapes

| | | Inference on Preference | | | | | | | | | | | | Grand Total | |
|------|------|-------------------------|------|----------|------|---------|------|----------|------|-------------|------|------|------|-------------|-----|
| | | Similar | | | | | | | | Not Similar | | | | | |
| | | Certainly | | Majority | | Average | | Minority | | Total | | None | | | |
| | | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % |
| Stu. | Ins. | 4 | 3.3 | 32 | 26.4 | 28 | 23.1 | 32 | 26.4 | 97 | 79.2 | 25 | 20.8 | 121 | 100 |
| | Stu. | 7 | 5.7 | 51 | 42.1 | 45 | 37.1 | 11 | 9 | 115 | 93.9 | 7 | 6.1 | 121 | 100 |
| Ins. | Ins. | 0 | 0 | 5 | 62.5 | 2 | 25 | 0 | 0 | 7 | 87.5 | 1 | 12.5 | 8 | 100 |
| | Stu. | 1 | 12.5 | 4 | 50 | 2 | 25 | 1 | 12.5 | 8 | 100 | 0 | 0 | 8 | 100 |

The greater percentage instructors (87.5%) and students (79.2%) both think that instructors have similar preferences with their own. This shows that both students and instructors are aware of the effect of the instructors on their preferences. Besides all of the instructors (100%) think that the students have similar preferences with them. That shows also the instructors are aware of their effect on the students' preferences.

However, the greater percentage of students (93.9%) think that other students have similar preferences with their preferences shows that students misperceive the effect of instructors, or intentionally hide the effect of instructors, or indirectly affected from the instructors; or because they are aware of the effect of instructors on other

students as same as the effect of the instructors on their preferences, they indirectly express the effect of instructors on their preferences.

As a result, common preferences of instructors and students on 2-D shapes and the dependence of students' preferences related to 2-D shapes on instructors' preferences show that there can be a collective decision process among the instructors to form their norms, or the norms of the institutional, or professional culture can be influential on the preferences of instructors, and the norms of the instructors might have been transferred to the students during the social interaction in the studio. In addition to this, instructors are aware of the effect of these norms on their preferences and the preferences of students, and students are aware of the effect of instructors on their preferences. Consequently, the claim of social choice theory is valid for the formation of students' preferences on 2-D shapes (that means there is an effect of others on the preferences of instructors and students on 2-D shapes).

3.3.2.The Analysis of Preferences on Figure-Figure Relationship

In relation to the figure-figure relationship, the responses to question 4, 5, and 6 are analyzed for both of the questionnaires. Students' and instructors' preferences from question 4, and their inferences on the similarity of their preferences to the preferences of instructors from question 5, and about the similarity of their preferences to other students' preferences from question 6 are examined. Firstly, the common preferences on figure-figure relationship among students and instructors are questioned, so the responses of the students and instructors to question 4 are separately examined. The preferences of students on figure-figure relationship are shown in Table 3.6.

Table 3.6 The Distribution of the Students' Priorities Determined by Figure-Figure Relationship

| Figure-Figure Rel. | Priority | | | | | | Total |
|--------------------|-----------|------------|------------|------------|-----------|----------|------------|
| | None | 1 | 2 | 3 | 4 | 5 | |
| Middle-Middle | 28 | 22 | 15 | 32 | 20 | | 117 |
| Middle-End | 18 | 22 | 39 | 26 | 13 | 1 | 119 |
| End-End | 24 | 15 | 23 | 37 | 15 | 1 | 115 |
| End-Center | 7 | 55 | 36 | 16 | 4 | | 118 |
| Other | 2 | | 1 | | 3 | 1 | 7 |
| Total | 79 | 114 | 114 | 111 | 55 | 3 | 476 |

In Table 3.6, it is observed that first priority is given to end-center relationship (48%) and middle-middle (35%) and end-end (30%) are not preferred at all by the majority of the students for figure-figure relationship. The preferences of instructors on figure-figure relationship are shown in Table 3.7.

Table 3.7 The Distribution of the Instructors' Priorities Determined by Figure-Figure Relationship

| Figure-Figure Rel. | Priority | | | | | | Total |
|--------------------|----------|----------|----------|----------|----------|----------|-----------|
| | None | 1 | 2 | 3 | 4 | 5 | |
| Middle-Middle | 2 | 1 | 0 | 3 | 1 | | 7 |
| Middle-End | 0 | 1 | 6 | 1 | | | 8 |
| End-End | 3 | 1 | 1 | 1 | | | 6 |
| End-Center | 0 | 6 | 1 | 1 | | | 8 |
| Other | | | 1 | | | | 1 |
| Total | 5 | 9 | 9 | 6 | 1 | 0 | 30 |

The distribution of instructors' preferences shows that first priority is given to end-center relationship (66%) and middle-middle (40%) and end-end (60%) are not preferred at all by the majority of the instructors for figure-figure relationship.

Comparison of the Preferences of the Students and Instructors on Figure-Figure Relationship

To clarify whether the instructors are affecting the formation of the preferences of students or not, their preferences are examined together. By this way, the similarity of their first preferences and not preferring cases in general, and then the similarity of the students' first preferences to their own instructors for each section is questioned. The distribution of the students' and instructors' first preferences and not preferring cases on 2-D shapes is shown in Table 3.8.

Table 3.8 The Distribution of Figure-Figure Relationship Preferences of the Students and Instructors

| | Figure-Figure Rel. | Students' Preference | Instructors' Preference |
|------------------|--------------------|----------------------|-------------------------|
| First Preference | Middle-Middle | 22 | 1 |
| | Middle-End | 22 | 1 |
| | End-End | 15 | 1 |
| | End-Center | 55 | 6 |
| | Other | 0 | 0 |
| Not Preferred | Middle-Middle | 28 | 2 |
| | Middle-End | 18 | 0 |
| | End-End | 24 | 3 |
| | End-Center | 7 | 0 |
| | Other | 2 | 0 |

The similarity of the common preferences and not preferring cases of the majority of between the students and the instructors is observed in Table 3.8. The instructors' and students' common preference on end-center and common dislike on end-end and middle-middle can be a sign of the effect of instructors on the majority of the students, as same as the effect of instructors on students' 2-D shape preferences to assure whether instructors are affecting students in forming these common

preferences, a statistical analysis has been done simultaneously on the preferences of the instructors and students. Since there is a possibility of the dependency of the students' preferences on the instructors' preferences in relation to their social interaction in the design studio, as well as to the other students. For this analysis, the common consent of basic design educators and the claim of social choice theory are used for testing.

As same as the previous analysis in section 3.3.1, the null hypothesis that students' preferences on figure-figure relationship are independent of the preferences of instructors is deduced from the common consent of basic design and alternative hypothesis that students' preferences on figure-figure relationship are dependent on the preferences of the instructors or other students from the claim of social choice theory. The relationship between the students and their own instructors preferences on figure-figure relationship is displayed in Table 3.9.

Table 3.9 The Relationship between Students and Instructors Preferences on Figure-Figure Relationship

| Instructors | First Preference | Students' Preference | | Total |
|-------------|------------------|----------------------|-------------|-------|
| | | Similar | Not Similar | |
| 1 | Middle-Middle | 2 | 16 | 18 |
| 2 | End-Center | 3 | 11 | 14 |
| 3 | End-Center | 5 | 11 | 16 |
| 4 | End-Middle | 3 | 14 | 17 |
| 5 | End-Center | 9 | 7 | 16 |
| 6 | End-Center | 7 | 2 | 9 |
| 7 | End-Center | 6 | 11 | 17 |
| 8 | End-Center | 6 | 8 | 14 |
| Total | | 41 | 80 | 121 |

The result of Chi-Square test can be summarized as ($\chi^2 = 19,01$, $df = 7$, $P < 0.01$) the students' preferences are not independent of the preferences of the instructors on figure-figure relationship. This can be interpreted as the effect of instructors on students' figure-figure relationship preferences, and the reason of the common preferences among students.

Inferences of the Students and Instructors between and among them

To understand the students' and instructors' level of awareness related to the effect of others on their own preferences, the responses about the inferences are investigated. The distribution of students' and instructors' inferences on the similarity of the students' and instructors' preferences of the students and the instructors on figure-figure relationship is shown in Table 3.10.

Table 3.10 Distribution of Subjects' Inferences on the Preference of Instructors and Students on Figure-Figure Relationship

| | | Inference on Preference | | | | | | | | | | Grand Total | | | |
|------|------|-------------------------|----------|---------|----------|-------|-------------|------|------|------|------|-------------|------|-----|-----|
| | | Similar | | | | | Not Similar | | | | | | | | |
| | | Certainly | Majority | Average | Minority | Total | None | | | | | | | | |
| | | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % | | |
| Stu. | Ins. | 18 | 14.8 | 42 | 34.7 | 38 | 31.4 | 11 | 9 | 109 | 89.9 | 12 | 10.1 | 121 | 100 |
| | Stu. | 8 | 6.6 | 32 | 26.4 | 58 | 47.9 | 17 | 14.0 | 115 | 94.9 | 6 | 5.1 | 121 | 100 |
| Ins. | Ins. | 1 | 12.5 | 3 | 37.5 | 3 | 37.5 | 1 | 12.5 | 8 | 100 | 0 | 0 | 8 | 100 |
| | Stu. | 0 | 0 | 2 | 25 | 4 | 50 | 1 | 12.5 | 7 | 87.5 | 1 | 12.5 | 8 | 100 |

All of the instructors (100%) and the greater percentage of the students (89.9%) both think that instructors have similar preferences with their own, as well as the greater percentage of the instructors (87.5%) that think the students have similar preferences with their own. This shows that both students and instructors are aware of the effect

of the instructors on their figure-figure relationship preferences as same as their awareness on the effect of instructors on their 2-D shape preferences, and the instructors are aware of their effect on the students' preferences.

However, the greater percentage of students (94.9%) think that other students have similar preferences with their preferences shows that students misperceive the effect of instructors, or intentionally hide the effect of instructors, or indirectly affected from the instructors; or because they are aware of the effect of instructors on other students as same as the effect of the instructors on their preferences, they indirectly express the effect of instructors on their preferences.

As a result, common preferences of instructors and students on figure-figure relationship and the dependence of students' preferences related to figure-figure relationship on instructors' preferences show that there can be a collective decision process among the instructors to form their norms, or the norms of the institutional, or professional culture can be influential on the preferences of instructors, and the norms of the instructors might have been transferred to the students during the social interaction in the studio. In addition to this, instructors are aware of the effect of these norms on their preferences and the preferences of students, and students are aware of the effect of instructors on their preferences. Consequently, the claim of social choice theory is valid for the formation of students' preferences on figure-figure relationship, (that means there is an effect of others on the preferences of instructors on figure-figure relationship).

3.3.3. The Analysis of Preferences on Figure-Ground Relationship

In this analysis, the responses of the students and instructors to question 7, 8, and 9 are separately examined in each questionnaire. The students' and instructors' preferences in question 7, and their inferences on the similarity of their preferences to the instructors in question 8, and with the other students' in question 9 are examined. Firstly, to understand whether the students and instructors have common preferences, the responses of the students and instructors to question 7 are separately investigated. The preferences of students on figure-ground relationship are shown in Table 3.11.

Table 3.11 The Distribution of Students' Priorities Determined by Figure-Ground Relationship

| Fig-Ground Rel. | Priority | | | | | | Total |
|--------------------|-----------|------------|------------|------------|-----------|----------|------------|
| | None | 1 | 2 | 3 | 4 | 5 | |
| End-End | 8 | 38 | 36 | 25 | 5 | | 112 |
| Middle-Middle | 27 | 8 | 27 | 40 | 9 | | 111 |
| Center-Center | 7 | 58 | 28 | 15 | 5 | | 113 |
| Center-Half Center | 47 | 8 | 19 | 19 | 19 | 1 | 112 |
| Other | 4 | | | 1 | 3 | 2 | 8 |
| TOTAL | 93 | 112 | 110 | 100 | 41 | 3 | 456 |

In Table 3.11, it is observed that the majority of the students have common preferences on figure-ground relationship. They mostly prefer center-center relationship (51.78%) and do not prefer center-half center relationship (50.54%) at all. The preferences of instructors on figure-ground relationship are shown in Table 3.12.

Table 3.12 The Distribution of the Instructors' Priorities Determined by Figure-Ground Relationship

| Figure-Ground Rel. | Priority | | | | | | Total |
|--------------------|----------|----------|-----------|-----------|----------|----------|-----------|
| | None | 1 | 2 | 3 | 4 | 5 | |
| End-End | 4 | 1 | 1 | 1 | 1 | | 8 |
| Middle-Middle | 2 | 0 | 2 | 3 | 1 | | 8 |
| Center-Center | | | 5 | 2 | 1 | | 8 |
| Center-HalfCenter | | 7 | | 1 | | | 8 |
| Other | | | | | | | 0 |
| TOTAL | 6 | 9 | 10 | 10 | 7 | 5 | 32 |

Also, it is observed that most of the instructors have common preferences on figure-ground relationship in Table 3.12. Most of them prefer center-half center relationship (87.5%) and do not prefer end-end (66%) and middle-middle (34%) relationship at all.

Comparison of the Preferences of the Students and Instructors on Figure-Ground Relationship

The effect of the instructors on the formation of the students' preferences requires the examination of the students' and instructors' preferences together. In general the similarity of their first preferences and not preferring cases and for every section the similarity of the students' first preferences to their own instructors are examined. The distribution of the students' and instructors' first preferences and not preferring cases on figure-ground relationship are shown in Table 3.13.

Table 3.13 The Distribution of Figure-Ground Relationship Preferences of Students and Instructors

| | Figure-Ground Rel. | Students' Preference | Instructors' Preference |
|------------------|--------------------|----------------------|-------------------------|
| First Preference | End/End | 38 | 1 |
| | Middle/Middle | 8 | 0 |
| | Center/Center | 58 | 0 |
| | Center/Half-Center | 8 | 7 |
| | Other | 0 | 0 |
| Not Preferred | End/End | 8 | 4 |
| | Middle/Middle | 27 | 2 |
| | Center/Center | 7 | 0 |
| | Center/Half-Center | 47 | 0 |
| | Other | 4 | 0 |

Eventhough, Table 3.13 shows that the common preferences of the majority of the students and the instructors are different than each other. This investigation does not assure that instructors are not affecting students in forming these common preferences. Thus, a simultaneous analysis is done between the distribution of instructors' and students' preferences, since there is a possibility of the dependency of the students' preferences on instructors' preferences in relation to their social interaction in the design studio.

As same as the previous analyses in Section 3.3.1 and 3.3.2, the common consent of basic design educators and the claim of social choice theory are used for testing. To clarify whether the instructors are the source of effect on common preferences of students on figure-ground relationship, the null hypothesis that students' preferences on figure-ground relationship are independent from the preferences of instructors is based on the common consent of basic design educators. The alternative hypothesis

that students' preferences on figure-ground relationship are not independent from the preferences of instructors is based on the claim of social choice theory. The relationship between the students and instructors preferences on figure-ground relationship is displayed in Table 3.14.

Table 3.14 The Relationship between Students and Instructors Preferences on Figure-Ground Relationship

| Instructors | First Preference | Students' Preference | | Total |
|-------------|--------------------|----------------------|-------------|-------|
| | | Similar | Not Similar | |
| 1 | Center-Half Center | 1 | 17 | 18 |
| 2 | End-End | 4 | 10 | 14 |
| 3 | Center-Half Center | 0 | 16 | 16 |
| 4 | Center-Half Center | 0 | 17 | 17 |
| 5 | Center-Half Center | 1 | 15 | 16 |
| 6 | Center-Half Center | 0 | 9 | 9 |
| 7 | Center-Half Center | 0 | 17 | 17 |
| 8 | Center-Half Center | 4 | 10 | 14 |
| Total | | 10 | 111 | 121 |

Table 3.14 shows that Chi-Square test can not be applied for this case due to the empty cells, so a statistical interpretation on the independence between instructors and students preferences on figure-ground relationship is not possible. Therefore, a descriptive interpretation is made on the independence between instructors and students preferences on figure-ground relationship.

Inference of the Students and Instructors between and among them

To understand students' and instructors' awareness to the effect of others on their preferences on figure-ground relationship, the responses about inferences are descriptively investigated. The distribution of students' and instructors' inferences

about the similarity of preferences of students and instructors on figure-figure relationship is shown in Table 3.15.

Table 3.15 Distribution of Subjects' Inferences about the Preference of Instructors and Students on Figure-Ground Relationship

| | | Inference on Preference | | | | | | | | | | Grand Total | | | |
|------|------|-------------------------|------|----------|------|---------|-------------|----------|------|-------|------|-------------|------|------|-----|
| | | Similar | | | | | Not Similar | | | | | | | | |
| | | Certainly | | Majority | | Average | | Minority | | Total | | | | None | |
| | | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % | | | Fre. | % |
| Stu. | Ins. | 24 | 19.8 | 39 | 32.2 | 32 | 26.4 | 13 | 10.7 | 109 | 89.1 | 13 | 10.9 | 121 | 100 |
| | Stu. | 5 | 4.1 | 37 | 30.5 | 58 | 47.9 | 17 | 14 | 118 | 96.5 | 4 | 3.5 | 121 | 100 |
| Ins. | Ins. | 2 | 25 | 3 | 37.5 | 2 | 25 | 0 | 0 | 7 | 87.5 | 1 | 12.5 | 8 | 100 |
| | Stu. | 0 | 0 | 6 | 75 | 2 | 25 | 0 | 0 | 8 | 100 | 0 | 0 | 8 | 100 |

Although, it is not possible to make a statement on the effect of others; the greater percentage of instructors (100%) and students (89.1%) both think that the instructors have an effect on the students' preferences. This can be described as the tendency of instructors to affect the students or tendency of the students to be affected by the instructors. Also, it could be explained as the awareness of students to the tendency of instructors to affect them or awareness of the instructors to the tendency of students to be affected by instructors.

In addition to this, if the common preferences among instructors and among students are interpreted as the result of their effect on each other. The greater percentage of one instructor's inference on the similarity of the other instructors' preferences (87.5%), and the greater percentage of one student's inference on the similarity of the other students' preferences (96.5%) can be interpreted as the awareness of the instructors and the students on the effect of others among the group on their preferences. If the common preferences among students and instructors are not

interpreted as their effect on each other, it may show another common source of effect such as certain perceptual tendencies which can be more valid for students because of their lack of design experiences.

For this case, the effect of others on preferences of instructors and students could not be statistically examined. However, the majority of the students have common preferences, as well as the majority of the instructors, but the common preference of the majority of the students are different than the majority of the instructors. In conclusion, firstly there may be a collective decision process among the students and among the instructors. Secondly, they both may have some perceptual tendencies or past experiences towards figure-ground relationship preferences. Thirdly, the norms of the institutional or the professional culture can be affecting the most of the instructors to form their common preferences on figure-ground relationship, but these norms do not affect students' preferences in a way.

3.3.4. The Analysis of Preferences on Types of Organizations

In this part, the responses of the students and instructors to question 10, 11, and 12 are separately examined in each questionnaire. The students' and instructors' preferences in question 10, and their inferences on the similarity of their preferences to the instructors in question 11, and to the other students' in question 12 are examined. Firstly, the responses of the students and instructors to question 10 are separately investigated to understand whether the students and the instructors have common preferences on types of organizations. In Table 3.16 the preferences of students on types of organizations are shown.

Table 3.16 The Distribution of Students' Priorities Determined by Types of Organizations

| Types of Org. | Priority | | | | | | Total |
|---------------|-----------|------------|------------|-----------|-----------|----------|------------|
| | None | 1 | 2 | 3 | 4 | 5 | |
| Central | 2 | 73 | 22 | 14 | 2 | 3 | 116 |
| Linear | 6 | 8 | 40 | 39 | 19 | 4 | 116 |
| Radial | 14 | 17 | 30 | 27 | 19 | 9 | 116 |
| Grid-Iron | 34 | 4 | 9 | 15 | 33 | 16 | 111 |
| Clustered | 36 | 15 | 20 | 17 | 16 | 11 | 115 |
| Other | 4 | 4 | 1 | | 2 | 2 | 13 |
| TOTAL | 96 | 121 | 122 | 91 | 45 | 3 | 590 |

The common preferences of the majority of the students on types of organizations is observed in Table 3.16. They mostly prefer central organizations (60%) and do not prefer clustered (37%) and grid-iron organizations (35%) at all. The preferences of instructors on types of organizations are shown in Table 3.17.

Table 3.17 The Distribution of the Instructors' Priorities Determined by Types of Organizations

| Types of Org. | Priority | | | | | | Total |
|---------------|----------|----------|----------|----------|----------|----------|-----------|
| | None | 1 | 2 | 3 | 4 | 5 | |
| Central | | | 1 | 3 | 3 | | 7 |
| Linear | 1 | 1 | 2 | 2 | | 1 | 7 |
| Radial | 2 | 2 | 1 | | 2 | | 7 |
| Grid-Iron | | 4 | 3 | | 1 | | 8 |
| Clustered | 2 | 1 | 2 | 2 | | 1 | 8 |
| Other | | | | | | | |
| TOTAL | 5 | 8 | 9 | 7 | 6 | 2 | 37 |

Also, it is observed that most of the instructors have common preferences on types of organizations in Table 3.17. Most of them prefer grid-iron (50%) and do not prefer clustered (40%) and radial organizations (40%) at all.

Comparison of the Preferences of the Students and Instructors on Types of Organizations

To understand the effect of the instructors on the formation of the preferences of students on types of organizations, their preferences are examined together. The similarity of their first preferences and not preferring cases in general and the similarity of the students' first preferences to their own instructors for every section are the points of interest. The distribution of the students' and instructors' first preferences and not preferring cases on types of organizations is shown in Table 3.18.

Table 3.18 The Distribution of Types of Organizations Preferences of Students and Instructors

| | Type of Organization | Students' Preference | Instructors' Preference |
|------------------|----------------------|----------------------|-------------------------|
| First Preference | Central | 73 | 0 |
| | Linear | 8 | 1 |
| | Radial | 17 | 2 |
| | Grid-Iron | 4 | 4 |
| | Clustered | 15 | 1 |
| | Other | 4 | 0 |
| | Not Preferred | Central | 2 |
| Linear | | 6 | 1 |
| Radial | | 14 | 2 |
| Grid-Iron | | 34 | 0 |
| Clustered | | 36 | 2 |
| Other | | 4 | 0 |

Unless a statistical analysis is done between the distribution of instructors' and students' preferences, since there is a possibility of the dependency of the students' preferences on instructors' preferences in relation to their social interaction in the design studio, the difference between the common preferences of the majority of the students and of the instructors in Table 3.18 does not assure that instructors are not affecting students in forming these common preferences.

Similar to the analyses in sections 3.3.1, 3.3.2 and 3.3.3, the common consent of basic design educators is turned into the null hypothesis that students' preferences on types of organizations are independent from the preferences of instructors to statistically test whether the instructors are the source of effect on common preferences of students on types of organizations. The claim of social choice theory is turned into the alternative hypothesis that students' preferences on types of organizations are not independent from the preferences of instructors. The relationship between the students and instructors preferences on types of organizations is displayed in Table 3.19.

Table 3.19 The Relationship between Students and Instructors Preferences on Types of Organizations

| Instructors | First Preference | Students' Preference | | Total |
|-------------|------------------|----------------------|-------------|-------|
| | | Similar | Not Similar | |
| 1 | Grid-Iron | 0 | 18 | 18 |
| 2 | Linear | 3 | 11 | 14 |
| 3 | Radial | 3 | 13 | 16 |
| 4 | Radial | 4 | 13 | 17 |
| 5 | Grid-Iron | 1 | 15 | 16 |
| 6 | Grid-Iron | 0 | 9 | 9 |
| 7 | Clustered | 2 | 15 | 17 |
| 8 | Grid-Iron | 1 | 13 | 14 |
| Total | | 14 | 107 | 121 |

Due to the empty cells in Table 3.19, Chi-Square test can not be applied for this case as same as the Section 3.2.4.3. If a statistical interpretation on the independence between instructors and students preferences on types of organizations is not possible, a descriptive interpretation can be made on the independence between instructors and students preferences on figure-ground relationship.

Inference of the Students and Instructors between and among them

The awareness of students and of instructors to the effect of others on their preferences on types of organizations is investigated descriptively. The distribution of students' and instructors' inferences about the similarity of preferences of students and instructors on types of organizations is shown in Table 3.20.

Table 3.20 Distribution of Subjects' Inferences about the Preference of Instructors and Students on Types of Organizations

| | | Inference on Preference | | | | | | | | | | | | Grand Total | |
|------|------|-------------------------|------|----------|------|---------|------|----------|------|-------------|------|------|------|-------------|-----|
| | | Similar | | | | | | | | Not Similar | | | | | |
| | | Certainly | | Majority | | Average | | Minority | | Total | | None | | | |
| | | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % | | |
| Stu. | Ins. | 14 | 11.6 | 32 | 26.4 | 32 | 27.2 | 20 | 16.5 | 99 | 81.7 | 22 | 18.3 | 121 | 100 |
| | Stu. | 11 | 9 | 43 | 35.5 | 48 | 40.5 | 14 | 11.5 | 117 | 96.5 | 4 | 3.5 | 121 | 100 |
| Ins. | Ins. | 1 | 12.5 | 3 | 37.5 | 1 | 12.5 | 2 | 25 | 7 | 87.5 | 1 | 12.5 | 8 | 100 |
| | Stu. | 2 | 25 | 3 | 37.5 | 3 | 37.5 | 0 | 0 | 8 | 100 | 0 | 0 | 8 | 100 |

The tendency of instructors to affect the students or tendency of the students to be affected by the instructors, and/or the awareness of students to the effort of instructors to affect them or awareness of the instructors to the tendency of students to be affected by instructors can be stated due to the greater percentage of the instructors (100%) and the students (81.7%) think that the instructors have an effect on the students' preferences in Table 3.20, eventhough it is not possible to make a statement on the effect of others.

In addition to this, if the common preferences among instructors and among students are interpreted as the result of their effect on each other. The awareness of the instructors and the students on the effect of others among the group on their preferences can be interpreted from the greater percentage of one instructor's inferences on the similarity of the other instructors' preferences (87.5%), and the greater percentage of one student's inferences on the similarity of the other students' preferences (96.5%) in Table 3.20. If the common preferences among students and instructors are not interpreted as their effect on each other, it may show another common source of effect such as certain perceptual tendencies, or past experiences which can be more valid for students because of their lack of design experiences.

For this case, although the effect of others on preferences of instructors and students could not be statistically examined, the different common preferences among the majority of the students and of the instructors shows firstly there may be a collective decision process among the students and among the instructors. Secondly, they both may have some perceptual tendencies or past experiences towards types of organization preferences, and thirdly the norms of the institutional or professional culture can be affecting the most of the instructors to form their common preferences on types of organizations, but these norms do not affect students' preferences on types of organizations in a way, as same as preferences on figure-ground relationship.

3.3.5. The Analysis of Preferences on Design Principles

The responses of the students and instructors to question 13, 14, and 15 are separately examined in each questionnaire in this analysis. The students' and instructors' preferences in question 13, and their inferences on the similarity of their preferences to the instructors in question 14, and with the other students' in question 15 are examined. Firstly, to understand whether the students and instructors have common preferences on design principles, the responses of the students and instructors to question 13 are separately investigated. The preferences of students on design principles are shown in Table 3.21.

Table 3.21 The Distribution of Students' Priorities Determined by Design Principles

| Design Principles | Priority | | | | | | Total |
|----------------------|------------|------------|------------|------------|------------|------------|------------|
| | None | 1 | 2 | 3 | 4 | 5 | |
| Repetition | 8 | 14 | 12 | 18 | 11 | 11 | 74 |
| Rhythm | 5 | 5 | 9 | 12 | 6 | 7 | 44 |
| Dominance | 5 | 14 | 12 | 10 | 6 | 10 | 57 |
| Variation | 3 | 14 | 11 | 14 | 20 | 13 | 75 |
| Transformation | 18 | 3 | 4 | 9 | 8 | 7 | 49 |
| Axiality | 21 | 13 | 3 | 3 | 6 | 5 | 51 |
| Symmetry | 3 | 39 | 10 | 15 | 11 | 9 | 87 |
| Assymetrical Balance | 16 | 4 | 10 | 10 | 5 | 11 | 56 |
| Contrast | 8 | 2 | 7 | 3 | 8 | 10 | 38 |
| Growth | 5 | 8 | 17 | 10 | 16 | 7 | 63 |
| Rotation | 8 | 9 | 14 | 11 | 7 | 9 | 58 |
| Hierarchy | 12 | 13 | 7 | 6 | 7 | 7 | 52 |
| Other | 4 | 1 | | | | | 5 |
| TOTAL | 116 | 139 | 116 | 121 | 111 | 106 | 709 |

In Table 3.21, it is observed that the majority of the students have common preferences on design principles. They mostly prefer symmetry (28%) and do not

prefer axiality (18%) and transformation (16%) at all. The preferences of instructors on design principles are shown in Table 3.22.

Table 3.22 The Distribution of the Instructors' Priorities Determined by Design Principles

| Design Principles | Priority | | | | | Total |
|----------------------|----------|---|---|---|---|-------|
| | None | 1 | 2 | 3 | 4 | |
| Repetition | | 2 | 2 | 1 | | |
| Rhythm | | 4 | 1 | | 1 | |
| Dominance | | | 1 | | 1 | 1 |
| Variation | | | 3 | 1 | | 2 |
| Transformation | 1 | | | | 1 | |
| Axiality | | | 6 | 1 | 1 | |
| Symmetry | 1 | | | 1 | | |
| Assymetrical Balance | 1 | 1 | | | 1 | |
| Contrast | | | 1 | 1 | | 2 |
| Growth | | | | 1 | | |
| Rotation | 2 | | 1 | | | |
| Hierarchy | | 2 | 1 | | | |
| Other | | | | | | |
| TOTAL | | | | | | |

Also, it is observed that most of the instructors have common preferences on design principles in Table 3.22. Most of them prefer rhythm (44%) and do not prefer rotation (40%) at all.

Comparison of the Preferences of the Students and Instructors on Design Principles

Although, the students and instructors have stated their common preferences independently; to clarify whether the instructors are affecting the formation of the preferences of students or not, their preferences are examined together. This

examination focuses on the similarity of their first preferences and not preferring cases in general and then the similarity of the students' first preferences to their own instructors for every section. The distribution of the students' and instructors' first preferences and not preferring cases on design principles is shown in Table 3.23.

Table 3.23 The Distribution of Design Principle Preference of Students and Instructors

| | Design Principles | Students' Preference | Instructors' Preference |
|------------------|----------------------|----------------------|-------------------------|
| First Preference | Repetition | 14 | 2 |
| | Rhythm | 5 | 4 |
| | Dominance | 14 | 0 |
| | Variation | 14 | 0 |
| | Transformation | 3 | 0 |
| | Axiality | 13 | 0 |
| | Symmetry | 39 | 0 |
| | Assymetrical Balance | 4 | 1 |
| | Contrast | 2 | 0 |
| | Growth | 8 | 0 |
| | Rotation | 9 | 0 |
| | Hierarchy | 13 | 2 |
| | Other | 1 | 0 |
| Not Preferred | Repetition | 8 | 0 |
| | Rhythm | 5 | 0 |
| | Dominance | 5 | 0 |
| | Variation | 3 | 0 |
| | Transformation | 18 | 1 |
| | Axiality | 21 | 0 |
| | Symmetry | 3 | 1 |
| | Assymetrical Balance | 16 | 1 |
| | Contrast | 8 | 0 |
| | Growth | 5 | 0 |
| | Rotation | 8 | 2 |
| | Hierarchy | 12 | 0 |
| | Other | 4 | 0 |

Eventhough, Table 3.23 shows that the common preferences of the majority of the students and the instructors are different than each other, this investigation does not

assure that instructors are not affecting students in forming these common preferences. Thus, a simultaneous analysis is done between the distribution of instructors' and students' preferences, since there is a possibility of the dependency of the students' preferences on instructors' preferences in relation to their social interaction in the design studio. To clarify whether the instructors are the source of effect on common preferences of students on design principles, the common consent of basic design educators and the claim of social choice theory are used for testing. As same as the analyses in previous Sections 3.3.1, 3.3.2, 3.3.3 and 3.3.4, The common consent of basic design educators is turned into the null hypothesis that students' preferences on design principles are independent from the preferences of instructors. The claim of social choice theory is turned into the alternative hypothesis that students' preferences on design principles are not independent from the preferences of instructors. The relationship between the students and instructors preferences on design principles is displayed in Table 3.24.

Table 3.24 The Relationship between Students and Instructors Preferences on Design Principles

| Instructors | First Preference | Students' Preference | | Total |
|-------------|------------------|----------------------|-------------|-------|
| | | Similar | Not Similar | |
| 1 | Rhythm | 1 | 17 | 18 |
| 2 | Rhythm | 1 | 13 | 14 |
| 3 | Repetition | 0 | 16 | 16 |
| 4 | Rhythm | 0 | 17 | 17 |
| 5 | Repetition | 3 | 13 | 16 |
| 6 | Rhythm | 0 | 9 | 9 |
| 7 | Hierarchy | 3 | 14 | 17 |
| 8 | Hierarchy | 3 | 11 | 14 |
| | Total | 11 | 110 | 121 |

Table 3.24 shows that Chi-Square test can not be applied for this case due to the empty cells, so a statistical interpretation on the independence between instructors

and students preferences on design principles is not possible. Therefore, a descriptive interpretation is made on the independence between instructors and students preferences on design principles.

Inference of the Students and Instructors between and among them

Though, it is not statistically possible to deal with the effect of others on the preferences, the responses about inferences are investigated to understand students' and instructors' awareness to the effect of others on their preferences on design principles. The distribution of students' and instructors' inferences about the similarity of preferences of students and instructors on design principles is shown in Table 3.25.

Table 3.25 Distribution of Subjects' Inferences about the Preference of Instructors and Students on Design Principles

| | | Inference on Preference | | | | | | | | | | Grand Total | | | |
|-----|-----|-------------------------|------|----------|------|---------|-------------|----------|------|-------|------|-------------|------|------|-----|
| | | Similar | | | | | Not Similar | | | | | | | | |
| | | Certainly | | Majority | | Average | | Minority | | Total | | | | None | |
| | | Fre. | % | Fre. | % | Fre. | % | Fre. | % | Fre. | % | | | Fre. | % |
| Stu | Ins | 16 | 13.2 | 35 | 28.9 | 37 | 30.5 | 16 | 13.2 | 105 | 85.8 | 17 | 14.2 | 121 | 100 |
| | Stu | 7 | 5.7 | 49 | 40.4 | 52 | 42.9 | 9 | 7.4 | 118 | 96.4 | 4 | 3.6 | 121 | 100 |
| Ins | Ins | 1 | 12.5 | 2 | 25 | 3 | 37.5 | 1 | 12.5 | 7 | 87.5 | 1 | 12.5 | 8 | 100 |
| | Stu | 0 | 0 | 5 | 62.5 | 2 | 25 | 1 | 12.5 | 8 | 100 | 0 | 0 | 8 | 100 |

Although, it is not possible to make a statement on the effect of others; the greater percentage of instructors (100%) and students (85.8%) both think that the instructors have an effect on the students' preferences. This can be described as the tendency of instructors to affect the students or tendency of the students to be affected by the instructors. Also, it could be explained as the awareness of students to the effort of instructors to affect them or awareness of the instructors to the tendency of students to be affected by instructors.

In addition to this, if the common preferences among instructors and among students are interpreted as the result of their effect on each other. The greater percentage of one instructor's inference on the similarity of the other instructors' preferences (87.5%), and the greater percentage of one student's inferences on the similarity of the other students' preferences (96.4%) can be interpreted as the awareness of the instructors and the students on the effect of others among the group on their preferences. If the common preferences among students and instructors are not interpreted as their effect on each other, it may not only show another common source of effect such as certain perceptual tendencies, or past visual experiences which can be more valid for students because of their lack of design experiences.

As a result, the effect of others on preferences of instructors and students could not be statistically examined for this case. However, the majority of the students have common preferences, as well as the majority of the instructors, but the common preference of the majority of the students are different than the majority of the instructors. In conclusion, firstly there may be a collective decision process among the students and among the instructors. Secondly, they both may have some perceptual tendencies or past experiences towards design principle preferences, and thirdly the norms of the institutional and/or professional culture can be affecting the most of the instructors to form their common preferences on design principles, but these norms do not affect students' preferences on design principles in a way, as same as preferences on figure-ground relationship and types of organizations.

4. CONCLUSION

The importance of preferences in forming a successful artifact makes the role of basic design education critical, since design students start to form their sets of preferences during this period. Therefore, the factors that are affecting the formation of basic design students' preferences on visual aspects of design are important. One of these factors is the social interaction with the instructors and the other students. However, there is a conflict between the assumption of social choice theory and the common consent of basic design educators. While the social choice theory proposes that the effect of social interaction will result similar sets of preferences among the individuals, the common consent of basic design educators on preference formation assumes that the effect of social interaction will result distinguished sets of preferences among individuals.

Therefore, this study has realized to see whether the assumption of social choice theory or the common consent among the basic design educators is valid for the preference formation in basic design studio. The findings of the study can be summarized as follows:

- On 2-D shapes and figure-figure relationship; the common preferences of the majority of instructors and students are similar. They both prefer the square while they do not prefer the pentagon at all for 2-D shapes. Also, They both prefer end-center relationship and middle-middle relationship at all for figure-figure relationship.
- On figure-ground relationship, types of organizations, and design principles; the common preferences of the instructors and the students are different. For figure-ground relationship, the majority of the students prefer center-center relationship

and do not prefer center- half center relationship at all, and the majority of the instructors prefer center-half center relationship and do not prefer end-end and middle-middle relationship at all. For types of organizations, the majority of the students prefer central organizations and do not prefer clustered and grid-iron organizations at all, but the majority of the instructors have common preferences on grid-iron organizations and do not prefer radial and clustered organizations at all. For design principles, the majority of the students prefer symmetry, and do not prefer axially and transformation at all, but the most of the instructors prefer rhythm and do not prefer rotation at all.

Although, there can be other effects on formation of preferences, such as ease to design and implement certain aspects of design in drawings and models (Denel, 1998, 50), findings show the effect of social interaction with instructor on students' preferences on 2-D shapes and figure-figure relationship, because the preferences of students are not statistically independent from the preferences of instructors on these visual aspects of design, and the effect of students' motor perceptual tendencies on students' preferences on figure-ground relationship, types of organizations, and design principles, because as it is claimed by Köhler (1992) motor perceptual tendencies are visual tendencies of individuals which favor the priority of certain alternatives among visual aspects (353), and the preferences of students on figure-ground relationship, types of organizations, and design principles coincides with the alternatives that are favored by the motor perceptual tendencies for these visual aspects of design . That means because motor perceptual tendencies favor central relationships among figure-ground relationships (Arnheim, 1974, 14), central organizations among types of organizations (Arnheim, 1988, 4), and symmetry

among design principles (Arnheim, 1974, 145); students prefer central relationships, central organizations, and symmetry.

The reason of the effect of social interaction on 2-D shapes and figure-figure relationship, and the effect of motor perceptual tendencies on figure-ground relationship, types of organizations, and design principles can be related with the characteristics of these visual aspects of design. Because 2-D shapes and figure-figure relationships are the aspects that they are faced off during their past educational experiences, so they are more familiar to these aspects than figure-ground relationship, types of organizations, and design principles. Also, the reason can be that these visual aspects of design require complex decision process and determine the further steps of design process rather than 2-D shapes and figure-figure relationship.

On the other hand, the common preferences among the majority of instructors on visual aspects of design show that motor perceptual tendencies are not affective on the preferences of instructors because their preferences are different than the prior preferences of people that are directed by their motor perceptual tendencies. Thus, the preferences of instructors can be affected by other instructors, and/or by the norms of institutional and/or professional culture that they belong to, and/or by the dominant architectural ideology.

At the same time, students' idea on the similarity of their preferences to their instructors' preferences about visual aspects of design, and instructors' idea on the similarity of students' preferences to their preferences shows that the effect of

instructors on students' preferences is explicit but not obligatory, because instructors are not affecting the preferences of students on every aspect of design. Also, students' idea on the similarity of their preferences to other students' preferences about visual aspects of design shows the explicit characteristic of the effect of other students on students' preferences and/or the awareness of the students on the common source of the effect among students. Similarly, the instructors' idea on the similarity of their preferences to other instructors' preferences shows the explicit characteristic of the effect of other instructors, and/or the awareness of instructors on the common source of the effect among instructors.

In conclusion, social choice theory is statistically valid only for the preference formation of students' preference on 2-D shapes and figure-figure relationship, Preferences on other visual aspects of design may be formed under the effect of motor perceptual tendencies. This situation may prevent the formation of distinguished sets of preferences. In relation to this situation, Teymur (1998) stated that the common consent of basic design educators that students become creative during their basic design education as a result of formation of distinguished sets of preferences is only a myth (22).

In this case, to turn towards methods and exercises that compel students to use different visual aspects of design rather than the ones that are suggested by their motor perceptual tendencies can be proposed. For further studies, the effect of other factors on the preferences of basic design students, the shift in the preferences of students during further design education and probable preference formation differences between different basic design methodologies can be investigated. In

addition to this, investigation on the validity of other common consents on design education will be helpful to develop relevant approaches in basic design education.

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APPENDIX 1

Section: _____

QUESTIONNAIRE FOR STUDENTS

1- Some of the 2-D geometric shapes are shown below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Other (Draw below)

2- According to you, do your instructors make a similar preference about the 2-D geometric shapes ?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

3- According to you, do your friends make a similar preference about the basic geometric shapes ?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

4- Some figure-figure relationships are shown below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Other (Draw below)

5- According to you, do your instructors make a similar preference about the figure-figure relationship?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

6- According to you, do your friends make a similar preference about the figure-figure relationship?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

7- Some figure-ground relationships are shown below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Other (Draw below)

8- According to you, do your instructors make a similar preference about figure-ground relationship ?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

9- According to you, do your friends make a similar preference about figure-ground relationship ?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

10- Some types of organizations are stated below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) ---- Central b-) ---- Linear c-) ---- Radial
d-) ---- Grid f-) ---- Clustered g-) ---- Other (Please state below)

11- According to you, do your instructors make a similar preference about types of organizations?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

12- According to you, do your friends make a similar preference about types of organization?

- a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

13- Some principles of design are stated below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) --- Repetition

b-) --- Rhythm

c-) --- Dominance

d-) --- Variation

e-) --- Transformation

f-) --- Axiality

g-) --- Symmetry

h-) --- Assymetrical Balance

i-) --- Contrast

j-) --- Growth

k-) --- Rotation

l-) --- Hierarchy

m-) --- (Please state below)

14- According to you, do your instructors make a similar preference about the principles of design?

- a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

15- According to you, do your friends make a similar preference about the principles of design?

- a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

APPENDIX 2

Section: _____

QUESTIONNAIRE FOR INSTRUCTORS

1- Some of the 2-D geometric shapes are shown below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Other (Draw below)

2- According to you, do your colleagues make a similar preference about the 2-D geometric shapes ?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

3- According to you, do your students make a similar preference about the basic geometric shapes ?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

4- Some figure-figure relationships are shown below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Other (Draw below)

5- According to you, do your colleagues make a similar preference about the figure-figure relationship?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

6- According to you, do your students make a similar preference about the figure-figure relationship?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

7- Some figure-ground relationships are shown below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Other (Draw below)

8- According to you, do your colleagues make a similar preference about figure-ground relationship ?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

9- According to you, do your students make a similar preference about figure-ground relationship ?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

10- Some types of organizations are stated below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) ---- Central b-) ---- Linear c-) ---- Radial
d-) ---- Grid f-) ---- Clustered g-) ---- Other (Please state below)

11- According to you, do your colleagues make a similar preference about types of organizations?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

12- According to you, do your students make a similar preference about types of organization?
a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

13- Some principles of design are stated below.

I- Put x to the ones that you do not use in your design projects.

II- Sort the remaining ones due to the frequency of usage for your design projects as 1,2,3,...

a-) --- Repetition

b-) --- Rhythm

c-) --- Dominance

d-) --- Variation

e-) --- Transformation

f-) --- Axiality

g-) --- Symmetry

h-) --- Assymetrical Balance

i-) --- Contrast

j-) --- Growth

k-) --- Rotation

l-) --- Hierarchy

m-) --- (Please state below)

14- According to you, do your colleagues make a similar preference about the principles of design?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

15- According to you, do your students make a similar preference about the principles of design?

a-) Certainly b-) In Majority c-) Average d-) In Minority e-) None

APPENDIX 3

Kısım(Section): _____

SORMACA (ÖĞRENCİLER İÇİN):

1- Aşağıda bazı 2-B geometrik şekiller gösterilmiştir.

I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.

II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.

a-) ----  b-) ----  c-) ----  d-) ----  e-) ----Diğer (Çiziniz)

2- Sizce, öğretim görevlinizin geometrik şekillerle ilgili benzer bir tercihi var mı?

a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

3- Sizce, arkadaşlarınızın geometrik şekillerle ilgili benzer bir tercihi var mı?

a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

4- Aşağıda bazı şekil-şekil ilişkileri gösterilmiştir.

I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.

II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Diğer (Çiziniz)

5- Sizce, öğretim görevlinizin şekil-şekil ilişkisiyle ilgili benzer bir tercihi var mı?

a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

6- Sizce, arkadaşlarınızın şekil-şekil ilişkisiyle ilgili benzer bir tercihi var mı ?

a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

7- Aşağıda bazı şekil-zemin ilişkileri gösterilmiştir.

I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.

II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Diğer (Çiziniz)

- 8- Sizce, öğretim görevlinizin şekil-zemin ilişkisiyle ilgili benzer bir tercihi var mı?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 9- Sizce, arkadaşlarınızın şekil-zemin ilişkisiyle ilgili benzer bir tercihi var mı ?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 10- Aşağıda bazı organizasyon biçimleri belirtilmiştir.
I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.
II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.
a-) ---- Merkezi (Central) b-) ---- Çizgisel (Linear) c-) ---- Işınsal (Radial)
d-) ---- Izgara (Grid-iron) e-) ---- Kümesel (Clustered)
f-) ---- Diğerleri (belirtiniz)
- 11- Sizce, öğretim görevlinizin organizasyon biçimleriyle ilgili benzer bir tercihi var mı ?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 12- Sizce, arkadaşlarınızın organizasyon biçimleriyle ilgili benzer bir tercihi var mı ?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 13- Aşağıda bazı tasarım prensipleri belirtilmiştir.
I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.
II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.
a-) --- Tekrar (Repetition) b-) Ritm (Rhythm) c-) --- Egemenlik (Dominance)
d-) --- Çeşitlilik (Variation) e-) --- Dönüşüm (Transformation) f-) Eksensellik (Axiality)
g-) --- Simetri (Symmetry) h-) --- Asimetrik Denge (Assymetrical Balance) i-) --- Zıtlık (Contrast)
j-) --- Büyüme (Growth) k-) --- Dönme (Rotation) l-) --- Hiyerarşi (Hierarchy)
m-) --- Diğerleri (belirtiniz)
- 14- Sizce, öğretim görevlinizin tasarım prensipleriyle ilgili benzer bir tercihi var mı?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 15- Sizce, arkadaşlarınızın tasarım prensipleriyle ilgili benzer bir tercihi var mı?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

APPENDIX 4

Kısım(Section): _____

SORMACA (ÖĞRETİM GÖREVLİLERİ İÇİN):

1- Aşağıda bazı 2-B geometrik şekiller gösterilmiştir.

I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.

II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.

a-) ----  b-) ----  c-) ----  d-) ----  e-) ----Diğer (Çiziniz)

2- Sizce, meslektaşlarınızın (öğretim görevlisi) geometrik şekillerle ilgili benzer bir tercihi var mı?

a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

3- Sizce, öğrencilerinizin geometrik şekillerle ilgili benzer bir tercihi var mı?

a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

4- Aşağıda bazı şekil-şekil ilişkileri gösterilmiştir.

I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.

II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Diğer (Çiziniz)

5- Sizce, meslektaşlarınızın (öğretim görevlisi) şekil-şekil ilişkisiyle ilgili benzer bir tercihi var mı?

a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

6- Sizce, öğrencilerinizin şekil-şekil ilişkisiyle ilgili benzer bir tercihi var mı ?

a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok

7- Aşağıda bazı şekil-zemin ilişkileri gösterilmiştir.

I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.

II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.

a-) ----  b-) ----  c-) ----  d-) ----  e-) ---- Diğer (Çiziniz)

- 8- Sizce, meslektaşlarınızın (öğretim görevlisi) şekil-zemin ilişkisiyle ilgili benzer bir tercihi var mı?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 9- Sizce, öğrencilerinizin şekil-zemin ilişkisiyle ilgili benzer bir tercihi var mı ?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 10- Aşağıda bazı organizasyon biçimleri belirtilmiştir.
I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.
II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.
a-) ---- Merkezi (Central) b-) ---- Çizgisel (Linear) c-) ---- Işınsal (Radial)
d-) ---- Izgara (Grid-iron) e-) ---- Kümesel (Clustered)
f-) ---- Diğerleri (belirtiniz)
- 11- Sizce, meslektaşlarınızın (öğretim görevlisi) organizasyon biçimleriyle ilgili benzer bir tercihi var mı ?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 12- Sizce, öğrencilerinizin organizasyon biçimleriyle ilgili benzer bir tercihi var mı ?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 13- Aşağıda bazı tasarım prensipleri belirtilmiştir.
I- Tasarımlarınızda hiç kullanmadıklarınız var ise, yanına x koyun.
II- Geri kalanları tasarımlarınızdaki kullanma sıklığınıza göre 1,2,3,... şeklinde sıralayın.
a-) --- Tekrar (Repetition) b-) Ritm (Rhythm) c-) --- Egemenlik (Dominance)
d-) --- Çeşitlilik (Variation) e-) --- Dönüşüm (Transformation) f-) Eksensellik (Axiality)
g-) --- Simetri (Symmetry) h-) --- Asimetrik Denge (Assymetrical Balance) i-) --- Zıtlık (Contrast)
j-) --- Büyüme (Growth) k-) --- Dönme (Rotation) l-) --- Hiyerarşi (Hierarchy)
m-) --- Diğerleri (belirtiniz)
- 14- Sizce, meslektaşlarınızın (öğretim görevlisi) tasarım prensipleriyle ilgili benzer bir tercihi var mı?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok
- 15- Sizce, öğrencilerinizin tasarım prensipleriyle ilgili benzer bir tercihi var mı?
a-) Kesinlikle b-) Çoğunlukla c-) Ortalama d-) Azınlıkla e-) Yok