

**AN ANALYSIS OF BASIC DESIGN STUDENTS' INTUITIVE AND  
ANALYTIC ATTITUDES IN COLOUR DECISIONS**

A THESIS

SUBMITTED TO THE DEPARTMENT OF  
INTERIOR ARCHITECTURE AND ENVIRONMENTAL DESIGN  
AND THE INSTITUTE OF FINE ARTS

OF BİLKENT UNIVERSITY

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF  
MASTER OF FINE ARTS

By

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September, 2003

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## ABSTRACT

### AN ANALYSIS OF BASIC DESIGN STUDENTS' INTUITIVE AND ANALYTIC ATTITUDES IN COLOUR DECISIONS

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Colour can be defined as a subjective preference, an experience and an intuitive sense, or as a theory and a science. Design education regards colour as a scientific theory by means of reasoning. The design students' colour decisions, values, and intuitive attitudes are aimed to be developed and cultivated by colour education in basic design, and supported and equipped by knowledge towards analytical attitudes. Thus, the major concern of this study is to analyze the progression of basic design students' intuitive and analytical attitudes in colour decisions by means of aesthetic values in case of Interior Architecture and Environmental Department of Bilkent University. The results of the research show that during the progression of colour education in basic design, the students' colour decision tendencies towards subjective and intuitive attitudes have a decrease and their tendencies towards knowledge-based and analytical attitudes have an increase.

**Keywords:** Colour, Colour Education, Aesthetic Values, Decision-Making

## ÖZET

### TEMEL TASARIM ÖĞRENCİLERİNİN RENK KARARLARINDAKİ SEZGİSEL VE ANALİTİK YAKLAŞIMLARININ İNCELENMESİ

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İç Mimarlık ve Çevre Tasarımı Bölümü

Yüksek Lisans

Tez Yöneticisi: Dr. Sibel Ertez Ural

Eylül, 2003

Renk kişisel bir tercih, deneyim ve sezgisel bir duygu ya da teori ve bilim olarak tanımlanabilir. Tasarım eğitimi rengi, gerekçelendirme yoluyla bilimsel bir teori olarak kabul etmiştir. Temel tasarımdaki renk eğitimi, tasarım öğrencilerin renk kararlarını, değerlerini ve sezgisel yaklaşımlarını geliştirerek, terbiye ederek, bilgiyle destekleyerek ve donatarak analitik yaklaşımlara ulaşmalarını amaçlamıştır. Bu anlamda, bu çalışma esas olarak Bilkent Üniversitesi İç Mimarlık ve Çevre Tasarımı bölümünde, temel tasarım öğrencilerinin sezgisel ve analitik yaklaşımlarındaki renk kararlarının aşamalı ilerlemesini estetik değerlendirmeler yoluyla incelemiştir. Araştırma sonuçları temel tasarımdaki renk eğitimi boyunca, öğrencilerin kişisel ve sezgisel yaklaşımlarındaki renk karar eğilimlerinde düşme olduğunu, ve bilgi tabanlı ve analitik yaklaşımlarındaki eğilimlerinde yükselme olduğunu göstermektedir.

**Anahtar Kelimeler:** Renk, Renk Eğitimi, Estetik Değerler, Karar Verme

## ACKNOWLEDGEMENTS

Foremost, I would like to thank to my supervisor Dr. Sibel Ertez Ural for her infinite guidance, support and tolerance during the development and finalization of this work.

Also I would like to thank to Assist. Prof. Dott.-Arch. Markus Wilsing and Assist. Prof. Dr. Zeynep Uludağ for sparing their times and giving creative and helpful comments on my study.

I would like to thank to 2002-2003 Fall Semester of Basic Design Students for their participation in this study.

Special thanks for my love Sinan Yenigül for his continuous support, valuable opinions and positive attitude at hard times during the development of this thesis. Besides, I would like to thank to my friends Genco Akalın and Orhan Irmak for their kind interest in sharing their experiences and giving useful suggestions for this work.

Last, but not least, I would like to thank to my aunt Namiye Gürdal for her endless support, patience and trust in me, and thus, she is the reason of my success and achievement in here.

I dedicate this thesis to my mother Nadide Akbay and my father Erkut Akbay.

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## 1. INTRODUCTION

Colour is experienced as a fundamental feature of vision. Everyone sees the colours of the sky, earth, grass, flowers and all other visible objects. It illustrates the most emotional, intuitive and subjective response and gives us considerable pleasure (Kuehni 7). Colour has an intrinsic, intuitive quality of its own and defined as a subjective experience (Light 24.3).

Dependent of these aspects, colour in art and design acts in a different way. While art undertakes colour with its subjective, intuitive, and emotional aspects, design has taken on colour as an objective, scientific, and knowledge-based study because design accepts colour both its visual and formal, and functional qualities.

Subsequently, design education considers colour within visual and formal, and functional aspects, as a design element and as a part of visual composition principles.

Generally, design education looks upon colour as a scientific theory. Design students learn colour in a way of traditional and objective methods in colour education.

Accurately, colour education aims at providing design students to be able to understand the colour theory and features to use colour harmony arrangements in visual composition. Therefore, in the first year's curriculum as an introductory design education of every art school or art departments at universities, simple information and practice on colour and colour composition are placed in compulsory course such as basic design (Ünver 1003; Wong 5).

People have –more or less – an acquaintance with colour, so do the design students, which depend on their personal preferences, subjective experiences, and socio-cultural attributions. Design education has not ignored or rejects students’ subjective experiences and accumulation; however they can be enriched and honed with knowledge. Basic design education is the first step to cultivate design students’ intuitive and subjective attitudes towards colour. Consequently, colour education in basic design is one of the important stages in order to improve students’ visual thinking and reasoning needed for further colour designs. The process of cultivation begins with unfolding students’ intuitive attitudes towards colour. In order to examine and discuss the validity of reasons behind in the context of (basic) design discipline, these attitudes are interrogated by both design educators and design students. The aim is to make basic design students notice about reasoning. The process ends up with supporting and honing their accumulation by theoretical knowledge and equipping students with a scientific foundation in terms of both aesthetical and functional aspects.

Aesthetic quality of a visual organization of colour design places a major role in the colour education of basic design. Consequently, colour as an aesthetic value is the primary consideration in basic design education because preferences, symbolic and formal attitudes towards colour can be defined with aesthetics as a discipline. These values and attitudes are considered as an essential component to all the critical decision-makings throughout the design process (Ritterfeld 369). Thus, decision theory supports and helps to evaluate all of the above mentioned approaches and attitudes towards colour.

### **1.1. The Aim of the Thesis**

An exploration on the two contradictory points of colour – as an intuitive and subjective attitude, and as an objective and scientific theory, which is based on the elements of design and the objective principles of organization – will therefore be found valuable.

“In relation to the assumption of basic design education, students are expected to form personal distinguished sets of preferences [on colour]” (qtd. in Koyuncugil 35). When these personal sets of values, preferences and attitudes are cultivated, they transform into theoretical and analytical sets of attitudes. Light states that students of design have more or less developed intuitions and these subjective responses can be enriched and cultivated (24.1). Before going into further discussions on enriching and cultivating the subjective attitudes of students during design education; asking the following questions are necessary;

- How these intuitions and subjective responses appear and/or disappear during the design education?
- What kind of relations exist and/or can be observed between the appearance and/or disappearance of intuitive and subjective responses, theoretical and analytical acquirements during the progression of the design education?

In this study, the above pointed out questions are taken into consideration for colour, as well, hence, the research has been regulated in order to search for the progression of the design students’ intuitive and analytical attitudes towards colour decisions in basic design education. Consequently, the study has been conducted to search for

these approaches with an empirical study with the basic design students of Bilkent University, Department of Interior Architecture and Environmental Design.

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

The thesis consists of four chapters. The first chapter, which is ‘introduction’, briefly explains the aim and the scope of the study. Following, the second chapter introduces basic concepts of colour and basic design education, the role of colour in design is inspected under the basic elements of design and the principles of organizations of visual communication and grammatical rules as colour harmony. Design elements and colour as one of the visual element are examined, and its characteristics are discussed. The second chapter, also deals with the introductory/ basic design education – aims, objectives, and curriculum, and etc. – and colour in basic design education. This chapter investigates the two different points of view of preference formations as an aesthetic value of colour in design – which is discussed with the properties of sub headings such as symbolic and formal aesthetics – and as a decision making on colour – which is examined with the two system decision theories such as heuristic and analytic system processing in decision-making.

The third chapter introduces to the original study of the thesis. The aim, methodology of the study is discussed, the participants, the interview guide, and the procedure is explained. In this chapter also, the analysis and comparisons of the three 2D projects as Name-Poster, 2D-Pattern, and 2D-Organization have been done and examined by evaluating the colour decisions of the basic design students.

The last chapter, which is 'conclusion', discusses and synthesis the results of the data analysis of the colour decision attitudes of the students in two-dimensional projects, and tries to tie these discussions to certain conclusions.

## 2. COLOUR and BASIC DESIGN EDUCATION

### 2.1. Colour in Design

The term “design” is used in many ways to express different meanings. In general, the word implies selection and organization for some specific purpose or intention. “A dictionary definition of the word “design” uses the synonym “plan”: to design indeed means to *plan*, to *organize*, [to *create*] (Lauer and Pentak 4). Apart from the lateral meaning of design, it is defined as the arrangement of visual elements that underlies in the fine arts and applied design disciplines and it refers to a visual composition produced by the integration of various elements. Actually, composition is defined as the organization of elements, as well, and characteristics within in a defined area (Bowers 69). This arrangement can be visually pleasing, however used to express and communicate specific information and a message. Communication in design is comprised of a number of design elements including form, texture, layout, scale, size, and colour. Each of the elements helps the designer convey to the viewer the various aesthetic, social, political, and historical messages purposely installed in the context. (Lloyd 104). Additionally, this message may be expressed and even influenced through the careful visual organization of basic elements and basic principles of organizations, which comprises the grammar of the visual language, that are to be used in design area (Swann 11).

Design has visual characteristics and there is a strong relationship between design and visual perception. Gestalt psychology is important for understanding the

grammar of visual language, visual thinking and perception of visual organizations, which generates the basis of design elements and organizational principles.

Design elements and organization principles are important for visual composition and communication in design, in order to give messages or information to the viewer, as mentioned. Colour, as a design element, has always played a major part in conveying the many messages. Through colour these messages are easier to understand than the design itself (Lloyd 104). Subsequently, there is a strong correlation between colour and perception, and colour cognition of visual communication. “The perception of colour is the single most strongly emotional part of the visual process. Our reactions to colour are often strong and immediate, and we associate the most diverse experiences and emotions with colours” (Lowry 52).

It is obvious that colour is a key aspect in design for the visual communication. Colour in design is an important visual phenomenon, which modifies and defines form. Colour in design cannot be formulaic. It expresses history, shape or deepens space, adds density, and defines edges and proposes a mood and dept of experience that cannot be achieved in any other way (Bevlin 114 and Ladau viii).

While colour is an important element of visual communication and language in design, it interacts with organizational principles in visual composition. Although colour is usually considered as a subjective field of experience, it is studied on the basis of the elements of design and the objective principles of organization. Subsequently, the present chapter continues discussing, former basic elements of design and latter organizational principles and their interactions with colour.

### **2.1.1. Colour as a Design Element**

The design elements are the components or parts, which are defined in any design or work of art. They are the structure of a design, or composition and can carry a wide range of messages, which are the visual tools available to the designer and artist.

These tools are organized by using the design principles to create a design. All the elements of design are the components of visual communication, which can be identified and studied independently, however they affect each other.

The elements are, in fact, very much related to each other and cannot be easily separated in our visual experience. Tackled individually, they may rather abstract, but together they determine the ultimate appearance and contents of design (Wong 7).

There are certain elements, which comprise the grammatical rules of design which of each element is first considered as a conceptual element, then as a visual element in the vocabulary of design (Ching 2). “[Most theorists] separate them [design elements] for purposes of identification and analysis, in order to understand exactly what is meant by each and what is the potential for creating a design” (Bevlin 45).

While Ching categorizes them as conceptual and visual elements (2), Linton classifies the elements into three groups as theoretical, visual, and organizational (1).

Thus, Wong theorized a list of basic elements of design, which are the combination of two approaches as follows:

- a. Conceptual elements
- b. Visual elements
- c. Relational elements
- d. Practical elements (7).

Conceptual elements, the point, line, plane, and volume cannot be seen visually.

They do not actually exist but seem to be present.

**Point.** A point has no length, width, and depth, which specifies a position in space (Linton 2 and Wong 7).

**Line.** “The extension of a point in a given direction is a line” (Linton 2). Line is the most illusory and the most fundamental of the design elements and it is a basic tool of the designer (Bevlin 45-46).

**Plane.** A plane is bound by lines and has position and direction, which defines the external limits of a volume (Wong 7).

**Volume.** “Conceptually, a volume has dimensions of length, breadth, and depth. As a three-dimensional element in the vocabulary of design, a volume can be solid, which has length, breadth, depth, and bulk. It may contain or enclose space by planes and may also be space itself displaced by mass or void” (Linton 2). However, in two-dimensional design, volume is illusory (Wong 7).

When these conceptual elements become visible, visual elements occur, which are shape, size, colour, and texture. Visual elements form the most predominant part of a design because all two and three-dimensional form has visual characteristics. The work of art and design by means of visual composition are put together of shapes, colours, or movements (Arnheim, *The Power of the Centre* 1).

**Shape.** Shape refers to a form or an object, which is determined by the external outline and its boundaries (Arnheim, *Art and Visual Perception* 47 and Bowers 40).

**Size.** “All shapes have size. Size is relative if we describe it in terms of bigness and smallness, but it is also measurable” (Wong 7).

**Colour.** “A phenomenon of light and visual perception that may be described in terms of an individual’s perception of hue, saturation, and tonal value” (Ching 34).

Hue, intensity, and value (light to dark) serve to distinguish a form from its environment (Linton 2).

**Texture.** Texture is the visual and tactile quality given to a surface by the size, shape, colour, arrangement, and proportions of the parts (Ching 34). In two-dimensional form, texture is visual (Bowers 40). In three-dimensional design, the surface characteristics of form may be natural or specially treated to create smooth, rough, mat, glossy and other tactile qualities (Linton 2).

Visual elements interact through direction, position, space, and gravity that group the relational elements. Direction and position are perceived; however, space and gravity are felt in a composition (Wong 7). These principles of interaction govern the placement of elements and interrelationship of the shapes in a design, and influence understanding of meaning.

**Direction.** “Direction refers to a course of movement. Horizontal, vertical and diagonal lines of any angle move our eyes in a given direction” (Bowers 42).

**Position.** “Position refers to the placement of an element relative to other elements [in its environment or the visual field]” (Bowers 42).

**Space.** Space is not only the vehicle in which elements exist for the designer, but also it determines the elements in their aesthetic forms (Bowers 42).

Space is perhaps the most important aspect of interaction in a composition. The areas between and around elements are active participants in the composition, and can be as dominant and important as the elements themselves. Space can group, separate, and emphasize elements and allow the viewer to better distinguish elements and their roles in a composition (Bowers 44).

**Gravity.** The last characteristic of the relational elements is the gravity. The sense of gravity is not visual; however, it is psychological and it is felt in a design or a composition (Wong 8).

The practical elements are the combination of conceptual, visual, and relational elements, which underlie the content, and extension of a design or a composition as representation, meaning, and function (Wong 8).

**Representation.** “When a shape is derived from nature or the man-made world, it is representational. Representation may be realistic, stylized, or near abstract” (Wong 8).

**Meaning.** Meaning is present when the design conveys a message” (Wong 8).

**Function.** Function is present when a design is to serve a purpose” (Wong 8).

Colour is one of the gears of the visual elements has a strong relationship between the other design elements. As form and content, it effects the perception of the elements. Conceptually, colour makes the two-dimensional elements visible. Furthermore, it gives emphasis to the relational elements and also supports the content of the practical elements. Colour works with space, line, form and shape, texture and light as well. It is the attribute that most differentiates a form from its environment and also it affects the visual weight of a form (Ching 34).

A shape is distinguished from its surroundings because of colour. Colour is here is used in its broad sense, comparing not only all the hues of the spectrum but also the neutrals (black, white, and all the intermediate greys), and also all their tonal and chromatic variations (Wong 7).

Colour is a property of light, not an object itself. In other words, colour and light are not separate entities from each other. Without light no colour occurs, because objects have no colour of their own. However, objects have the ability to absorb or reflect the certain light waves and become visible to our eyes (Bowers 53; Gerritsen 12; Lauer and Pentak 230). Colour is experienced as an important aspect of vision. It draws out the most emotional response of all the design elements. Kuehni defines colour as “[C]olour, is an experience, [a visual thinking], poetically speaking a flower of our brain activity. Not only does it provide vital information about our surroundings, but also like the effluence of our other senses it gives us considerable pleasure” (7). Hence an experience of thinking has its own aesthetic quality.

Aesthetic quality of an experience comprises preferences, symbolic and formal meanings. Symbolic meanings of aesthetic experience have no intrinsic quality of its own, however standing for things that may in another experience be qualitatively experienced (Dewey 38). Colour can arouse a variety of memories and expectations, which refer to preferences, symbolic attitudes of aesthetic experience. The perception of volume and depth can be emphasized by colour. It identifies the elements and concepts and improves the understanding in ways that black and white may not (Bowers 53). In this sense, also harmony, contrast, balance, legibility, and colour coding on a work of art or design gain significance as an experience of formal aesthetics.

An experience of an aesthetic quality bases on the visual formation of colour. This visual formation depends on three categories as colour elements (basics), colour characteristics, and colour interactions (Bowers 33).

Colour basics refer to the colour definitions and features of colour. Beforehand, the term “colour” is often used same for describing colour lights and colour pigments, which are rather different colour meanings. When talking about colour, it has to be made quite clear to which of these one is being referred. The basis of colour depends on a duality. In order to work with colour lights and particularly with colour pigments, artists and designers have a long framework for understanding the variations among colours. It behaves little differently when it displays itself as a light colour than it does a pigment colour. The colour of light is the rays of direct light, whereas the reflected light is the colour of paint (Lauer and Pentak 230).

As is the case with any specialized field of study, colour has its own characteristics and vocabulary, which are known as dimensions and terminologies of colour. There are three dimensions of colour are known as hue – refers to the position of colour in the spectrum or colour wheel (Camgöz 1 and Wong 43), chroma (saturation) – is the degree of purity, intensity, or saturation of colour (Fehrman and Fehrman 26), and value (brightness) – is the degree of lightness or darkness in a colour (Zelanski and Fisher 16) by the design professionals (Melgosa et. al. 356). Besides, there are achromatic (hueless) colours depend on value scheme which are divided into three; white, black, and grey (Kuehni 41). All hues are reduced from the mixtures of the primary colours. Secondary colours are the mixture of primaries and the mixture of secondary colours comprise the tertiary colours (Birren 12 and Mayer 68).

The colour interactions for verbal language and visual representations include harmony of colours and colour principles. These characteristics are important in the design education in order to gain a true understanding of colour and to able to use it effectively in design. Additionally, while colour is one of the design elements of

visual communication and language in design, it interacts with organizational principles in visual composition and these dimensions create the basis of colour harmony as grammatical rules.

### **2.1.2. Colour and Principles of Visual Composition**

The elements of design are the materials of the designer; however, the principles establish the methods by which these materials are set in motion. The arrangement of elements and characteristics within a defined area refers to a composition. A composition requires a visually subjective character; however, more importantly, it expresses precise information and meaning (Bowers 69). Principles of organization and inter-relationships of lines, shapes, forms and colours are recognized as contributing to the effectiveness of the work of design, which comprises the rules of composition. These principles are based mainly on the way people see the visual organization effectively. Subsequently, Gestalt psychology is significant for understanding the aesthetic and harmonious perception, and the visual thinking of the viewer. Lang claims that “the relevant concepts of perception [...] are mostly from the terminology of the gestalt psychology of perception. 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” (qtd. in Ulusoy 2). Therefore, the basis of the organizational principles depends upon the Gestalt laws and theory. These laws are created as good Gestalt. It is a set of forms, which are organized to produce an uninterrupted, hence coherent, meaningful, aesthetic experience (Feldman 257). Feldman states that

Gestalt laws of visual organization are: proximity, similarity, continuity, and closure. Sometimes, these laws (generated by the Law of Prägnanz) are expressed as regularity, symmetry, and simplicity – principles that most of us recognize as rhythm, balance, and unity. For practicing artists [and designers] they translate into strategies for effective composition and design, that is, effective ways of organizing visual information (257).

Gestalt principles of visual organization are translated by artists and designers for effective composition and design. These principles are defined by Bevin (139), Lauer and Pentak (19), Wong (15), Zelanski and Fisher (51) as design principles, but named by Chetham et. al. as design concepts, categorized by Ching (145) as ordering principles and organizations, however classified by Bowers (42) and Feldman (249) as visual composition principles which are considered as rhythm, balance, emphasis, proportion and scale, variety, and unity. Additionally, while colour is an important element of design, it must be aware of how it interacts with the principles of organizations. The definitions and the purposes of aforesaid principles with colour as follows;

**Rhythm.** It is the movement from one idea, compositional area, or element to another, which is the result of hierarchy, contrast, and structure. The rhythmic use of colour is significant in informing a logical result to any artwork. Repeating hues are really important to any work because lack of hue repetition causes lack of unity in the design. The repeating hues impart the feeling of movement (Feisner 66). Feisner claims that feeling of movement as

Hue that is put into a sequence or progression allows the eye to move comfortably within a composition. The sense of progression imparts motion. We can achieve this colour progression with hues as we have already done with analogous hues. Progression from light to dark is another method, as is travelling from intense to dull. Also do not discount having a temperature

progression. This can create a push or pull spatial effect when used correctly (67).

**Balance.** It is the principle of design, which distributes the visual weight within a composition (Lauer and Pentak 76). Balance can be defined as an equal distribution of visual weight, which is a universal aim of a composition (Lauer and Pentak 78). Balance is affected by the proportion of hues in the design; otherwise contrast can affect the balance. Although colour balanced compositions are effectively by using unequal, or asymmetrical amounts of values, intensities, and temperatures, complementary colours would be balanced symmetrically (Feisner 69).

**Emphasis/ Focal point.** It is the understanding of principle in design as a feature to predominate and to allow the rest of the design work around it. Colour plays an important role in order to emphasize the message that proposed. In order to emphasize the message in the design Feisner defines the role of colours in the following paragraph.

Pure hues are more dominant than tints, shades, or broken colours, which can serve as sub-dominates or subordinates. We find that the more intense or pure a hue is the greater its impact. Any hue will appear more intense beside a dull one and, conversely, any hue will appear dull beside a more intense one. Intensity connotes action and should, therefore, be used for emphasis. Values, the lightness or darkness of a colour, also creates impact. The wider the contrast the greater the impact. [...]A pure hue paired with its complement also results in emphasis. Contrast can also be achieved when a pure hue is paired with a neutral or shade that is an equal visual mixture with its complement (72-73).

**Proportion and scale.** They are both basically referred to size; otherwise, they are two different principles. Proportion and scale acts differently in colour. Hue

proportion affects a hue's intensity and the function of temperature. When the exact proportions of hues are used, they give gentle, static effects. When the strongest hue in a composition is used within a least proportion, it becomes vivid (Feisner 69-70). Scale is investigated in two different ways; the actual area of colour and the boldness of the colour that used. The intensity of any colour is affected by the size of any surface. If a colour has a greater intensity, it will appear the colour bolder. Moreover, a hue has been transformed to another hue; its boldness is also changed and weakened (Feisner 69).

**Variety.** Variety consists of the differences in objects that add interest to a visual image. The essence of variety, which is the most obvious design principle, is contrast. Variety provides contrast to harmony and unity. It can be achieved by using opposites or strong contrasts. Changing the colour, size, point of view, and angle of a single object can add variety and interest to a visual image (Bevlin 203).

**Unity.** Unity means harmony or agreement exists among the elements in a design and harmony is used as another term for unity. If the various elements of design are not harmonious by means of separate and unrelated, a design falls apart and lacks unity (Lauer and Pentak 20).

The principle of harmony refers to the visual agreement of all parts of a work. The successful application of harmony results in unity, which is achieved by using the principles of design (Feisner 74).

Although colour is an important element of design, colour harmony has a strong interaction with the abovementioned principles of organizations. The last principle of organisation, is unity, comprises the discussion of this part as colour harmony.

The word “harmony” defined as a state of order, agreement, or aesthetically pleasing relationships among the elements of design of a whole (Thiel 164). “[W]hile harmony can involve some degree of discord or tension that attracts us; it is balanced by an overall appearance of continuity, of organized visual movement. A form that balances change with a level of consistency among its parts is often visually engaging and meaningful” (Bowers 69). Without unity or harmony, any work of art or design cannot function aesthetically (Bevlin 204).

Most theorists, M. E. Chevreul, Ewald Hering, Wilhelm Ostwald, Johannes Itten, etc. have dealt with the question how colours are related to one another. It means that which colours combine harmoniously. Colour theorists from Chevreul have tried to determine the variety of colours in which all items combine willingly and agreeably. Their purpose was to standardize all colour values and to create an objective system. (Arnheim, Art and Visual Perception 346; Fehrman and Fehrman 29).

Chevreul established certain rules and proportions for the art of colour harmony (Birren 34). His principles based on two categories as follows;

- a. Harmonies of Analogy [Similarity]
- b. Harmonies of Contrast (Birren 35; Feisner 21).

Understanding of what makes one combination of colours pleasing and another combination of colours unattractive can be difficult to realize because colour is in the

eye of beholder and there are no fixed principles of colour harmony (Fehrman and Fehrman 30). Itten states that “harmony implies balance, symmetry of forces. An examination of physiological phenomena in color vision will bring us closer to a solution of the problem” (19). Colour harmony depends on the state of equilibrium that eye and brain requires during the colour vision. Accordingly, colour theorists generate general guidelines that can help to create colour harmonies. These ways can be categorised into three; with same hue, with similar hues and with complementary hues.

A monochromatic colour harmony is the characteristics of the combination with the same hue. It is based on a single hue and its value and intensity (Bevlin 120; Fehrman and Fehrman 28; Feisner 75; Lauer and Pentak 250). The other scheme is an analogous colour scheme, which is the characteristic of the colour harmony with three and more similar hues. It combines several hues that adjacent to each other on the colour wheel and the hues may vary in values as well (Birren 37; Feisner 75).

The contrasting colour schemes are divided into four groups; direct complementary, double complementary, split complementary, and triad colour scheme, which give greater balance than the related colour schemes. The direct complementary colour schemes are based on two hues directly opposite in position and in character to each other on the colour wheel (Feisner 75; Lauer and Pentak 238). Arnheim defines that these colours are the judgement of eye and they complete each other (*Art and Visual Perception* 342). The second group of the contrast colours are split complementary colour scheme, which is shaped from any hue with two adjacent complements. The double complementary scheme is based on two pairs of complementary colours, which are adjacent to each other (Billger 232). The last category of the schemes is

the triad colour scheme, which offers the most contrast to the complementary. At the triad scheme the three hues are formed equidistant from each other at the colour wheel. (Feisner 76; Lauer and Pentak 250).

Although colour harmonies provide to use of various colour combinations, the interaction between colours offer mixing, combining, and creating with colour. It is found out that the effects of complementary colours upon each other, is the most important area for the colour interaction (Bevlin 130). Simultaneous contrast is the most important phenomenon of the colour contrasts. Itten states that “successive and simultaneous contrast suggest that the human eye is satisfied, or in equilibrium, only when the complementally relation is established” (19). The logic behind the simultaneous contrast is that, “the eye posits the complementary color; it seeks to restore equilibrium of itself. This phenomenon is referred to as successive [simultaneous] contrast” (Itten 19). The phenomena of simultaneous contrast occurs when the three situations that happen; interiority, overlapping, and juxtaposition (Caivano 393).

Colour itself and harmony of colour is accepted as the mental or psychological impression created in the mind of viewer by a particular observed object or surface. There is matter of fact that colour has an intrinsic and intuitive quality of its own (Light 24.3). It depends on perception, human cognition and developed or changed accordingly age, sex, race, education, and culture. Additionally, there are also some cultural and sociological aspects that affect human cognition and intuitive senses like trends, styles, and marketing. Therefore, these features are adequate to accept colour as a subjective experience, preference, and an intuitive sense. Besides, there is an objective and scientific side of colour, which is constituted of design, as an element

and as inter-relation between colour and principles of visual composition, and design education. Aforesaid discussions about colour in design have found significant place in design education in order to educate and hone the intrinsic features of colour. For this reason, colour education is important in design education, especially in introductory design education. In order to comprehend the characteristics of colour education, the following sections discuss the place of colour in introductory design and colour as a part of basic design education.

## **2.2. Colour in Introductory/ Basic Design Education**

Design is the profession of creating ambiances, environments, buildings, and objects by required functional, physical, social and environmental conditions, which combines several major components: humanities, social and physical sciences, technology, the creative arts, etc. Design is created in a field of tension between reason, emotion and intuition. Therefore, design education should be considered the demonstration of the ability to conceptualize, coordinate and execute the ideas of forms and spaces (Anon 3). The main objective of the design education is to allow students to obtain skills to create designs sufficient both aesthetically and technically (Ünver 1000). Margolin states that

Although design thinking in the contemporary world must be based on knowledge gained from many fields and disciplines, the core of design thinking remains the ability to conceive, plan and present ideas about products. Knowledge may be a source of inspiration, practical constraint, or criteria for evaluation, but knowledge is useless unless it is transformed in the designer's imagination into ideas and images, visions of the world that may be effectively communicated to others (xv).

Communication is the key aspect of design, which is actually based on the creation of the visual language. Design education and visual language is important for architecture and design students to widen their imagination and vision for the effective communication to others. Farivarsadri states that

[Design] education should prepare students as multidimensional, global persons ready for accepting their future roles in such a society. [...] The first year design education, as the foundation year, has a responsibility in not only helping students in learning some basic skills and developing their own method of designing but also in helping in developing their personality as independent, sensitive, critical persons with their own set of values (2-3).

As a matter of fact that design students develop a set of values and attitudes during their first year educational practice and these values and attitudes construct a basis for the education in upper classes (Farivarsadri 1). Bayındır explains these set of values by describing the aim of design education.

The aim in education is to yield the individual useful knowledge and let him gain the ability to make use of this knowledge in the best way for his future life. [...] Each new information is taken into memory as a useful value. The process of learning is dependent on the previous knowledge and also prepare for the next (5).

Introductory design education is the first step for the design students to improve themselves and to learn the basic principles of visual communication and language. Additionally, it provides design students to develop themselves by exploring,

- a. The combinations of visual perception and conceptual abstraction for the shared communication between the maker and the viewer,

- b. The development of a concept of spaces and skills with fundamental relationships between line, plane, volume, and mass,
- c. The interrelationship between visual structure, space, structure and materials as related to environment,
- d. The concept of usefulness for the basic intangibles like psychology, sociology, economy, aesthetics, etc (Denel 7).

At the introductory design education, it was thought in Bauhaus that basic design would lead to a better architectural design (Denel 9). In other words, design becomes concrete through by practicing and learning visual elements, principles of organization, and methods of creating and evaluating forms. Thus, Wong claims that

In the first year's curriculum [as an introductory design education] of every art school or university art department, regardless of the fields of specialization the students are follow later, there is always a course variously called Basic Design, Fundamental Design, Two Dimensional Design, etc., which deals with the grammar of the visual language (5).

Basic design education has developed as an introductory course in Bauhaus for artists and designers. It is obvious that this course has been an important and a powerful efficacy to design education (Lang, Temel Tasarım 3). Arnheim and Kepes claim that empiric sufficiency of Bauhaus education depends on the Gestalt theory of perception and laws to confirm the design principles of organization (qtd. in Lang, Temel Tasarım 4). The introductory course in Bauhaus has five goals which are in relation with each other. These are;

- a. Education of perception

- b. To increase the sensitivity towards environment (visual features of natural world)
- c. To gain the artistic efficacy
- d. To develop and enlighten the artistic thinking
- e. To uncover and deepen the psychological perception (Lang, Temel Tasarım 6).

“[I]tten who was the first person responsible for the program of *Vorkurs* (preliminary course, basic design) in the Bauhaus school used the method [and the purposes of the Bauhaus preliminary course] 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”” (qtd. in Koyuncugil 11-12). Design education aims to give students useful knowledge. Every new information and knowledge develops students’ values and attitudes towards design. Design is an activity, which consists of design problems. Therefore, students’ solutions, attitudes, and values towards design problems make their preference formations important in the design process because their preferences help them to generate distinguished products and creative solutions (Koyuncugil 9). Design activity comprises problem-solving processes, as well, which expands design students’ decision-making skills to creative solutions. As a result, “[t]his program can be summarized in a pair of opposites, intuition and method or subjective experience and objective recognition” (qtd. in Farivarsadri 24). Actually, design itself intimates subjectivity and objectivity. This means that it associates intuition and reason together. “[T]he problems given [in this program] 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” (Farivarsadri 111).

Except from the other organizational elements of design, colour on its own is a problem in design because it has the most subjectivity of all. However, it depends on a scientific theory. Therefore, design students’ colour values, attitudes, preferences and decisions are important issues for problem solving in design processes. In these respects, basic design education seems to be the main source of colour information.

The study of colour is an academic discipline in its own right, and has relations with many disciplines as an integral part. Unlike other design elements, colour may be regarded as containing a higher level of subjectivity, which expresses feelings, character and ambience along with the ideas of form, shape, edges, lines, volumes, depth, distance, and illusion (Light 24.3).

Colour can be defined as a subjective preference, an experience and an intuitive sense, or objectively as a theory and a science. Generally, design education regards colour as a scientific theory. In colour education process, design students learn colour in a way of traditional methods. Ünver states a scientific education on colour would increase the architecture’s and design’s success (1001) because colour science is unique in the field of design education (Bergström 964). Colour education aims to provide design students to be able to understand the differences among the colour elements and features besides being able to use colour harmony arrangements precisely. “In the first semester of the departments, simple information and practice on colour and colour composition are placed in compulsory course such as basic

design, graphic communication, design graphics, etc.” (Ünver 1003). When evaluated in the aspect of knowledge to be learned in design education could be classified in two groups; basic theory/ knowledge and practice on colour elements and colour arrangements, technical knowledge teaching and practice about colour designs in three-dimensional spaces (Ünver 1002).

The first group including the effects and importance of colour on design, colour systems and introduction of the colour characteristics (hue, value, chroma), the effects, features and importance of the colour elements, and general rules on colour harmony and their principles. Colour is placed as a basic knowledge in the first semester of basic design education. “The second group should be [...] in the fourth semester in order to leave enough time for electives and implementation in later projects” (Ünver 1002). Although colour in basic design education bases on scientific theory and knowledge, in a cross-cultural study, Symes and Takahashi showed that students of architecture in their search for knowledge often relied on their experiences (Janssens and Mikellides 329) because in studio works students perceive colour design as their own future responsibility (Bergström 964).

Students of architecture have more or less highly developed intuitions that are more or less adapted to dealing with ideation. These students also have more or less highly developed capacities for reasoning that are more or less adapted to problem solving. One important aspect however is that initially students subjective (intuitive) responses are more sensitive and more rapid than their objective (reasoned) responses. This is the nature of the way the mind works as we first sense and then reason. Certainly intuitive subjective responses are innate but they can be honed, developed and cultivated to serve and enrich reasoning (Light 24.1).

Introductory design education is the first step to develop, cultivate, and enrich design students' intuitive responses to colour because it has the most subjectivity of all the parameters of design. Subsequently, colour education is one of the important stages of basic design education to improve students' visual thinking, communication and organizations, additionally, further colour designs.

Introductory design education deals with the form rather than function. However, in two-dimensional forms, function can be more abstract and difficult to define (Bowers 6). When setting aside the functional aspects of design in introductory design education, beauty of a form is significant for expressing the aesthetic and visual quality of a design. Although the beauty of a form is highly subjective, it is an important consideration in the creation or evaluation of form. Furthermore, as colour defined as a preference, an experience and an intuitive sense, aesthetic quality of a visual organization of colour design places a major role in the colour education of basic design. There is a strong relation between colour design and its aesthetic value. In this sense, aesthetics has an important place in design as a discipline, which investigates and explains the beauty of two and three-dimensional abstract forms. For this reason, aesthetics is the primary consideration for the colour as a value in basic design education.

### **2.2.1. Colour as an Aesthetic Value in Basic Design**

“The word ‘aesthetic’ derives from the Greek *aisthanesthai*, ‘to perceive’, and *aistheta*, ‘things perceptible’, as contrasted with things immaterial. Hence the *Oxford English Dictionary* is correct in defining aesthetics as ‘knowledge derived from the senses’” (Porteous 19). Aesthetics is clearly of vital importance to the sense of well-

being. The psychologist Maslow offered hierarchy of needs over a generation ago for the well-being. At the top of the hierarchy, actualization needs and cognition and aesthetic are encountered the need for self-fulfilment when all other needs satisfied (Lang, Symbolic Aesthetics 15 and Porteous 7-8).

The notion of beauty embedded the conception of aesthetics. The question what beauty is has been at the centre of aesthetic theory since Classical Greece (Bayer 309 and Porteous 19). Balance, harmony, proportion, and order are the notions that appeared from this cultural source.

Prall states that all aesthetic questions involve preference. Moreover, aesthetics involves the art of discrimination, and art of making judgments (qtd. in Porteous 21). In art, design and architecture, preference formations and values on aesthetic discriminations and judgments, and criteria of decisions and choices play a very important role.

Preference is a personal attitude, which is based on the individuals' value system. Specifically, it is designers' attitude in architectural design process. Preference has two different sides of view in design although they do not act independently. On the one hand, preference is a subjective attitude that depends on the designer's intuitive senses, personality, background and cultural experiences, personal decisions and choices. On the other hand, preference is an objective approach, which depends on the theoretical knowledge of the architectural design field and acts with reasoning, hypothetical decision makings and choices. Architectural design education especially

basic design aims to provide students to improve their preference attitudes both subjectively and objectively.

There are several definitions about what preference is, but the concept of preference refers to different components. Sen claims that the notion of preference contains mental satisfaction, desires, choices, and values. However, it can not be concluded that all these components of preference will yield the same ranking (qtd. in Koyuncugil 10). Preference ratings and to use of scenic quality is important to integrate a psychological mechanism into design. Preference formation has been a subject matter in various fields. It incorporates as a psychological component into design, architecture, urban planning, environmental psychology, and management (Kaplan, Where Cognition and Affect Meet 56).

Preference judgments vary randomly from one person to the next. However, preference judgments are not negating to aesthetics (Kaplan, Perception and Landscape 46-47). In order to prevent the disagreements on aesthetic judgments, Santayana states a number of people have found it useful to understand the nature of the aesthetic experience by distinguishing among sensory, formal, and symbolic interactions between people and artefacts and their built environments (qtd. in Lang, Symbolic Aesthetics 11). Lang claims that “One of the fundamental goals of design has always been the aesthetic one- the creation of “delightful” rooms, buildings, townscapes, landscapes, [and artefacts]” (Symbolic Aesthetics 11).

Colour is one of the most important fields for design, architecture and psychology. Therefore, colour preference is the most thoroughly research areas within the colour

field. Colour preference is an attitude of aesthetic judgement. It depends on culture, symbolic meanings of colour, value judgments, and psychological conditions. Researches on colour preferences have explored the association with feelings, emotions, and colour. The researchers wondered to find out the physical relationship between colour and the emotional reactions of people. Research studies on colour investigated the relationship between colour preferences with given colours. Several of these studies measured the evaluative dimensions of colour preferences, in terms of pleasantness and unpleasantness. Besides, these studies concentrated on colour itself, as well, without considering any other variables (Fehrman and Fehrman 78-80).

The results of these studies suggest that an acceptable colour is defined by the object with which it is associated, and this relation is probably the product of cultural norms and expectations or subjective colour bias (Fehrman and Fehrman 81).

These studies try to find an objective approach to colour preferences regardless of the culture, education, age, gender, and the other factors. “[E]ach colour has its own meaning, denotation, symbol and emotional association for each person. Every colour connotes a different meaning, feeling or emotion to the perceiver of the colour in relation to his associations with colours. Even though this seems to be the proper way of colour preference, there are accepted meanings, connotations and effects of certain colours on humans, relying on the experiments done and being done throughout the years” (Başoğlu 30).

Besides, researchers and designers seek universal principles that can explain commonalities and difference in response. Therefore, researchers find out that the

basis of preference formation is categorized into two different points of views. First view points out preference as an aesthetic judgement and second view of preference, which includes decision making and choice (Kaplan, Where Cognition and Affect Meet 56). As preference is an aesthetic judgement, aesthetics itself include two universal principles of quality. Symbolic or associational and formal aesthetics are that of principles, components and values to define the aspects of meanings, connotations and preferences.

#### **2.2.1.1. Symbolic Aesthetics**

Symbolic aesthetics involves an understanding of positive and negative attitudes of people. Besides, an attitude is the combination of a belief about something and a foundation of value about it. It is the subject matter of the associational meanings of the artefact and environment that give people pleasure (Lang, Symbolic Aesthetics 11-19). “Any design ideology with a humanistic basis thus needs a clear positive theory of symbolic aesthetics [...] also symbolic meaning and the purposes served by symbolic aesthetics.” (Lang, Symbolic Aesthetics 12).

Design students’ symbolic attitudes towards colour are important in two-dimensional design by means of aesthetic value. In two-dimensional forms, function can be more abstract and difficult to define (Bowers 6). Therefore, colour is the most important element for the visual representations of the abstract forms. Colour can reflect mood, emotion, and time frame, and provide the symbolism. Consequently, this seems to be the significant relationship between preference, in terms of pleasantness or arousal and unpleasantness, and symbolic or associational meaning of colours. Students’ symbolic attitudes towards colour depend onto the culture, education, age, gender,

background and past experiences and the other factors. Symbolic approaches to colour are based onto the subjectivity of the design students. Therefore, design students reflect their attitudes subconsciously or consciously. In this study, the students' conscious colour decisions are taken into consideration because it is difficult to investigate subconscious symbols and associations in the abstract forms of the two-dimensional design.

#### **2.2.1.2. Formal Aesthetics**

Formal aesthetics is the judgment of universal principle on aesthetic quality, as well. “[F]ormal analysis of aesthetics focuses on the attributes of object as they contribute to aesthetic response. Such an analysis may consider such properties as size, shape, colour, complexity, and balance. Symbolic analysis of aesthetics focuses on factors that through experience produce connotative meanings such that the object implies something else” (Nasar 3).

The primarily components of formal aesthetics in design and architecture are the appreciation of the shapes, rhythms, complexities, and sequences of the visual world (Lang, *Symbolic Aesthetics* 11). Additionally, Wohlwill states the importance of traditionally assigned aesthetic features of design and architecture; coherence, enhances comprehension and aesthetic value, and complexity, produces involvement and enhances aesthetic value up to a point, which are synonyms for what have been called order and complexity (qtd. in Heath 6-7 and Nasar 103). In other words, complexity is the involvement component at surface level of analysis and it refers to as diversity and richness. Coherence is the component of making sense in this

surface level of analysis and it makes the picture plane easier to organize, to comprehend, to structure (Kaplan, Perception and Landscape 48).

The properties of formal aesthetics as size, shape, colour, rhythm, proportion, emphasis, balance, order and complexity refer to the basic elements and principles of composition that constitute a work of design. One of the properties of formal aesthetics is colour that has a strong association with the other possessions. Colour harmony comprises all the assets of formal aesthetics.

Regardless of medium, formal aesthetics provide the practical, if not also theoretical, framework for artistic expression and, specifically in this case, visual design and composition. As such, formal aesthetics are rooted in certain fundamental natural laws and therefore are capable of general, abstract, or universal expressions. In the application of formal aesthetics, the designer should take into account the effect of the combination and composition of elements and principles (Flanagan 75).

For the Bauhaus practitioners, formal aesthetics provided a means of creation and expression that allowed for a unity in composition and towards the various design applications undertaken in the school. As the overriding aim was to figure out how to best design spaces for personal and social interaction, knowledge of formal aesthetics was used to meet that aim and also interpret the effect (Flanagan 75).

The effects of formal elements of aesthetics operate on the viewer as an immediate appeal to the senses. Therefore, aesthetic experience and aesthetic object is that of aesthetic attitude interrelates with the concept of beauty or good taste (Holgate 29). Aesthetic experience separates characteristics of experiencing subject from properties of object. Feelings, pleasure and associational meanings are the example

of subjective experiences. However, attributes of symmetry and complexity are examples of properties of objects. The aesthetic experience of asymmetry, complexity, diversity, and harmony has been the dominant mood among the aesthetics of science (Gruber 5-6; Gärling, Anders and Mathias 77).

Aesthetics, in general, are considered as an essential component to all the critical decisions made throughout the design process. Aesthetic qualities become important in the decision-making process because design servers primarily aesthetic purposes (Ritterfeld 369) Even though, colour preferences and symbolic aesthetics are the attitude of decision making and choice which depends on subjective approaches, formal aesthetics rely upon theoretical, analytical and knowledge-based colour decisions.

### **2.2.2. Decision Making on Colour in Basic Design**

Preference formations consist of both aesthetics values and decision makings as two different view points. The first view of preference is an indicator of aesthetic judgements. As Kaplan states, the second view of preference as an alternative view which involves decision making and choice. This preference judgment reflects complex calculations by means of involving some process of choosing among alternatives (Where Cognition and Affect Meet 56).

The two contrasting views suggest that understanding preference involves an analysis of the relationship between cognition and affect. The “aesthetic” points of view seems to imply a purely affective role for preference, while from a decision-theory point of view, considerable analysis and calculation, and hence cognition, precede affective outcome. There are, however, independent grounds for suspecting that preference is the outcome of a far more complex interaction between cognition and

affect than either of these positions implies (Kaplan, Where Cognition and Affect Meet 56-57).

Decision-making refers to significant analysis and calculations, which is the cognitive process of reaching a decision and an outcome. Research and theory on decision making fall at the crossroads of a number of disciplines. The origins of decision theory are evidently to be found in the thinking of the founders of probability theory, utility theory and with the evolution of statistical theory. More recently, purely mathematical theory has been increasingly complemented by psychological investigations (Estes 263). The purpose of decision-making, whether by an individual or a group, is optimizing the outcomes of an action. There are four assumptions in all decision-making theories.

- a. In making a decision, an individual always uses a set of rules that relate to their experience, understanding of the issue and impacts, and their social/cultural background.
- b. The context in which the decision must be made provides the “specificity” of the decision.
- c. The generality of the decision, or the transferability of the action to other situations, affects an individual’s decision.
- d. The strength of heuristics (or proofs) or the perception of the strength of the heuristics of the individual will affect the ultimate decision (EETAP, 1998).

According to the assumptions “[t]he compilation or transfer of a decision to another context is sound constructivist theory and understanding the heuristics is basic training in [thinking] and reasoning” (EETAP, 1998). This thinking and reasoning in cognitive science has been so-called dual process framework (Kokis et. al. 27). Kokis et. al. states dual process theory as follows;

In such theories, one of the system is characterized as automatic, heuristic based, and relatively undemanding of computational capacity. [...] The other system (often termed the analytic system) conjoins the various characteristics that have been viewed as typifying controlled processing—serial, language-based, and computationally expensive cognition (27).

The dual process of the first system is ontogenetically earlier developing and that the second is both a phylogenetically and ontogenetically later developing system (Kokis et. al. 28). This dual process framework in decision theory is explained by two systems, which are named as heuristic system processing, and analytic system processing in decision making. The two-system decision theories rely on the division of information processing into two independent, but interactive, systems. Although they function in qualitatively distinct ways, both a heuristic system and an analytic system are to cognitive adaptation (Klaczynski 291). Both two processing information qualities; however, are supposed to carry a potential for the aesthetic decision-making (Ritterfeld 371).

#### **2.2.2.1. Heuristic System Processing**

Anderson claims that “the term heuristic *system* is a misnomer in a sense, since it implies a single cognitive system” (qtd. in Kokis et. el. 27). Sloman states that the heuristic system responds automatically and rapidly to the holistic properties of stimuli (qtd. in Kokis et. el. 27). Heuristic system processing is not consciously generated and seems to be pop into consciousness and feel intuitively correct (Sloman 5 and Epstein 714). Therefore, a distinguishing aspect of heuristic processing is that the judgement and decision that comes to mind is not the result of conscious efforts to reason. It has been referred to as associative, experiential, tacit, peripheral, intuitive and implicit processing (Klaczynski 292).

Decision making is important when experiencing the aesthetic quality of an object. Fechner identified a strong and well-received rule in the psychology of aesthetics, which claims perceived unity in diversity to be vital for an aesthetic experience (qtd. in Ritterfeld 370). Ritterfeld suggests that heuristic processing in aesthetic judgement based on social meanings (371). There are three crucial assumptions of heuristic processing as aesthetic judgements.

- a. Reference to different kinds of information, depending on a person's intentions,
- b. The reality that they may lead to different results depending on the information actually processed,
- c. Race, gender, age or social status facilitate a heuristic processing (Ritterfeld 371).

Culture, education, age, gender, background experiences and the other factors are the heuristic devises, which affect the process of heuristic decision making. In this sense, symbolic meanings or symbolic values are being connected with heuristic attitudes of the basic design students. Heuristics processing can be developed by knowledge, thinking and reasoning to the tendency for analytic processing (Kokis et. al. 28).

#### **2.2.2.2. Analytic System Processing**

Heuristic and analytic processing may function independently, but nonetheless, may simultaneously contribute to the same task. Analytic processing is consciously controlled, effortful, and deliberate, and dependent on the acquisition and utilization of abilities (Klaczynski 293). It has been referred to as ruled-based, explicit, central, and rational processing (Evans and Over 124).

This system encompasses the process of analytic intelligence that has traditionally been studied by information processing theorists trying to reveal the computational components underlying intelligence. The analytic system process information in terms of the internal structure of stimuli and uses systematic rules that operate on the components of stimuli, rather than processing in terms of holistic representations (Kokis et. al. 27).

Klaczynski states that “[w]hen analytic processing is predominant, individuals are meta-cognitively aware of engaging in decision making” (293). Even so, Chen and Chaiken claims that heuristic processes may continue to affect decisions in ways that cannot be consciously controlled (qtd. in Klaczynski 293). The analytic processing prescribed as the apex of cognitive development because analytic competencies include

[r]easoning consistent with the dictates of propositional logic, judgements based on comparisons between a priori probabilities, and logically consistent reasoning across problems that differ in their superficial qualities (Klaczynski 293).

In the light of these concerns, formal, thematic, and systematic approaches of students to their projects are generated by the analytic system processing in colour decisions. Therefore, systematic values are being connected with the analytical attitudes of the design students.

Considering the above discussed progressing of decision-making, Parson states that development of aesthetic experience in human nature is divided as heuristic and analytic, as well (308). Researches analyzing the development of aesthetic experience came to the conclusion that “[r]easons having to do with realism did appear at about seven years [of age], and that their number grew steadily until they

peaked at about eleven years” (Parsons 308). This development constitutes of four stages. Preferences, pleasantness or arousal and unpleasantness, favourites, associational and symbolic meanings are the responses to an aesthetic experience of children at the first stage. At the second stage, preferences and favourites are abandoned. Children of elementary school age tend to comment increasingly on formal aesthetics: questions of balance, harmony, contrast, repetition, grouping, and so on. The theme and the expressive qualities of an object become central to response at the third stage. This looks like a loss of the preference and judgment distinction achieved in the previous stage, and an abandonment of the notion of relevant reasons for judgement. Finally, at the mature stage, aesthetic qualities are thought of as qualities and systematic of an object itself, being in principle openly accessible and based on the perceptual or intentional aspect of an object. (Parsons 308-313).

There can be a strong association between the development of reasoning, aesthetic experience in human nature and that of in basic design education, specifically in colour. According to the theoretical framework of the thesis, design students’ attitudes towards colour have a progression and cultivation in basic design education. This progression may not be separated, however they affect each other. The attitude towards colour begins with personal sets of values. Schwartz claims that “[p]ersonal values are learned beliefs about preferred ways of acting or being which serve as “guiding principles in the life of a person or other social entity”” (qtd. in Olver and Mooradian 111). Certain values refer to opinions, beliefs, and considerations, e.g. interests, preferences, pleasantness and arousal, emotions, connotations and symbolic attitudes; they may be considered as cognitive (Elizur and Sagie 76). Preferences deal with likes and pleasantness and arousal, whereas symbolic values refer to

connotative and associational meanings of colour. Following, formal attitudes towards colour comprise of visibility and compositional rules. Being a formal, the physical and visual experience of an object is significant. The two or three-dimensional design is being visible by contrasts of colour. At that point, figure-ground relationship is an important component of visibility. Additionally, formal attitudes of colour depend on knowledge-based rules – balance, rhythm, harmony, unity, etc. -, which refer to visual compositional principles in design. The assets of the principles constitute thematic attitudes. Conceptually, they express visual compositions and support the practical elements of design. All these formal and thematic attitudes, actually, lead to systematic approaches, which refer to scientific, theoretical and analytical levels of design. Systematic attitudes sustain visual thinking and reasoning in colour design by colour theories and colour harmony principles. The progression finalizes with functional attitudes, which depend on purpose.

Both basic design education and students' values and attitudes take place this kind of cultivation. Functional attitudes are omitted because this study deals with two-dimensional designs of the basic design students. Hence, as a criterion, students' preferences, symbolic, formal, thematic, and systematic approaches in colour decisions are evaluated.

### **3. EMPIRICAL STUDY**

Design education, especially basic design education, aims to provide the elements and principles of organizations by means of reasoning and aesthetic judgements that the design students have not experienced before. Preferences, values, attitudes and decisions of students are very important in design process for design solutions. These preferences and values of students are significant in colour because people are much more acquaintance with colour when it is compared with the other design elements. Each and every design solutions contains decision-making in design process. In basic design education aesthetics is taken as a primary consideration; therefore, students' preferences, values, attitudes and decisions become vital in their projects.

The colour decisions and intuitive attitudes are aimed to be developed and cultivated by colour education in basic design, and supported and equipped by knowledge towards analytical attitudes. Basic design students' preferences, values, and attitudes on colour and the colour combinations appear as a result of decision making process. Decision theory explains this process by two systems; heuristic (intuitive) system processing and analytic system processing. Even though, colour preferences and symbolic values are the attitude of decision making and choice which depends on intuitive approaches, formal, thematic, and systematic attitudes rely upon theoretical, analytical and knowledge-based colour decisions. In order to analyze the validity and the accuracy of these statements, it has been studied by means of an empirical study

involving the basic design students of Interior Architecture and Environmental Design (IAED) department of Bilkent University.

### **3.1. The Scope of the Study**

The aim of study is to analyze and to examine the colour and colour composition decisions of basic design students within the context of intuitive and analytical approaches to the two-dimensional projects. Students of basic design education have personal, subjective and intuitive sets of values, preferences and attitudes. When these preferences and values are cultivated, it is expected that their intuitive attitudes transform into and supported by objective and analytical sets of approaches. If these claims are inferred for this case, the major concern of this thesis is to analyze the progression and cultivation of basic design students' intuitive and analytical attitudes in colour decisions by means of aesthetic values. The preferences, aesthetic values of the students about colour are considered as decision criteria. Consequently, for the evaluation of the purposes, basic design education of Interior Architecture and Environmental Design (IAED) Department of Bilkent University is chosen as the field of the study.

Introductory design education in IAED depends on the basic design studio courses which comprises of two semesters, two days/ nine hours per week. In general, the curriculum of the basic design studio is based on the following objectives:

- A restructuring of the perceptual experience of students for a formal analytical understanding of the environment-development of a VISUAL LANGUAGE.
- Transfer of the perceptual experience into a VERBAL LANGUAGE for further analysis and communication.

- SPACE ANALYSIS and SPACE GENERATION-an exhaustive study of spatial configurations both verbally and visually (Kural, An Introduction 1).

The first semester of basic design education comprises of two-dimensional and three-dimensional abstract designs. The tools of design is constituted of lines, planes, solids, and their geometric definitions and relations, pattern, colour, composition, texture, etc., and the concepts or themes of design is comprised of contrast, dominance, transformation, etc. Design elements as tools, and design principles as themes which are taken from the Gestalt Theory of Perception for the supportive formulations of the visual language are brought together in two-dimensional and followed by three-dimensional organizations (Kural, Temel Tasarım 93).

The second semester of the basic design studio has been programmed as an introduction to architectural design by including human dimensions and informal distances, openings, natural lighting, and functional organizations (Kural, An Introduction 1). That semester of education depends on functional and concrete organizations and continues to investigate the concepts that are established and gives emphasis on three-dimensional design.

The study focuses on the two-dimensional colour compositions, only the period in which two-dimensional design projects of the 2002-2003 first (fall) semester of the basic design studio in the Department of IAED in Bilkent University is investigated. The period begins with two-dimensional sketch problem to familiarize students with the basic design education and studio course, and to determine their background experiences and their level of visual thinking. The basic design students are required

to poster their names in the first day of the studio course, which is named as Name-Poster.

This continues with a set of pattern studies along three weeks (Appendix A.2). Basic design students ascertain patterns from nature and transform them into another pattern by altering their geometric shapes, regular geometries, and basic design elements in order to create a rhythmic organization, which is named as 2D-Pattern project. Similar to the goals of the introductory course in Bauhaus, the purpose is to improve students' perception, visual thinking, and to increase their sensitivity towards environment.

Feldman states that “[a]ll works of art [or design] exhibit certain *patterns* of working together—patterns sometimes called “principles” of design” (235). Therefore, the continuation of two-dimensional organization projects may be assumed as the development of design principles – along four weeks of the first semester (Appendix A.2) – through patterns by determining themes or concepts of design, and complex organizational and visual communication principles such as unity, variety, emphasis, and etc. Basic design students are free to use all the organizational principles, namely on the 2D-Organization project. This is the end of two-dimensional exercises and the introduction of three-dimensional design of the first semester.

Colour has been used by students in every project beginning with sketch problem without any theoretical knowledge and entirely based on their intuitive decisions. However, in relation to its theory and compositional principles, colour is studied analytically first in the two-dimensional organization projects. Subsequently, this

educational process – between the stages of sketch problem and two-dimensional organization projects - is important in order to understand the progression of students' intuitive and analytical attitudes in colour decisions.

### **3.2. Methodology of the Study**

There are three critical stages of two-dimensional projects that the basic design students faced with during the colour applications in 2002-2003 Fall Semester of basic design studio course, therefore the three two-dimensional projects are evaluated.

These stages are;

- Name-Poster project (sketch problem)
- 2D-Pattern project
- 2D-Organization project

**Name-Poster** project is the first day basic design studio work project of the fall semester, which is required students to collage their names by the technique of cut and paste with the media of coloured papers, magazines and newspapers onto the 40\*70 cm. grey card boards. They are free to use colour, texture, and material. This project is important to introduce students to design education, to understand the level of their visual thinking, and unfold the ability to design because the students' colour, colour composition and design decisions are based on their intuitive attitudes and their background experiences.

At the second project of **2D-Pattern**, the basic design students are demanded to use the primary colours, black and white and their mixtures on A4 drawing paper by the

technique of cut and paste with the media of gauge colours at third week of the semester (Appendix A.2). Although the students have not studied colour analytically, its theory and compositional principles, this process is significant for colour education in basic design. This leads them to subjective experimentation and discovery. This discovery is clarified by theory and theory is followed by objective practice (Light 24.3).

As an objective practice, it is asked to do Itten's colour wheel to rehearse using primary colours and their mixings to achieve secondary and tertiary colours. The aspects and features of colour and its characteristics as a vocabulary, which are hue, value, and chroma, are defined in detail. Additionally, the basic design students do practices by analyzing the characteristics of colour. This is based on the analysis of values by an achromatic value scale and analysis of saturation by corresponding values of hues at their saturated points. The continuation of the features of colour, colour harmony, and its compositional principles are explained by defining harmony of similarities - monochromatic and analogous hue schemes- harmony of contrasts – complementary hue schemes – simultaneous interaction between colours.

In the **2D-Organization** project, the basic design students employ a knowledge based and analytical approach. The approach of ranges is from achromatic or monochromatic scales to full spectral harmonies. In this project, the students learned fundamentals and basics of colour theory and its compositional harmony, and inter-relation between visual organizational principles. It was required to use the basic principles of organizations and colour theory principles by the cut and paste technique with the media of gauge colours on 35\*50 cm. thick paper at the seventh

week of the semester (Appendix A.2). The 2D-Organization was the last project of the two-dimensional designs of the fall semester.

These approaches and the projects illustrate the importance of the intuitive (subjective) side with the theoretical and analytical knowledge base on the colour education in the basic design education. The progression of the basic design students' intuitive and analytical attitudes in colour decisions of their three two-dimensional projects, Name Poster (sketch problem), 2D Pattern, and 2D Organization, are found significant to analyze.

Interview guide with open-ended questions was required to the basic design students as participants at the end of the each project. The goal is to understand the reasons and decisions about the selected colours and colour composition criteria of the students (Appendix A.1). Generalizations from the answers of the interview guide were made according to the certain criteria.

The pilot study was done with 10 basic design students at the IAED in order to test the validity of the interview guide and the evaluation of the criteria. At the pilot study, the evaluation criteria consist of six categories as preferences, symbolic, formal, coding, thematic, and systematic. According to critiques of the instructors, coding is excluded from the criteria because formal values include colour coding, harmony, contrast, and balance. Therefore, the pilot study was devised in order to prevent the problems that would be occurring in the empirical study. The result of the pilot study shows that there is a certain progressive development in the attitudes of

basic design students' colour decisions. Subsequently, the empirical study widened at the same department of Bilkent University.

### **3.2.1. Participants**

The participants are the first year basic design students of Interior Architecture and Environmental Design Department of Bilkent University. The total number of basic design comprises of 81 students, however the repeating students of basic design course are omitted in order to prevent the bias that will occur. The students who did not submit any of the three projects are excluded as well. Finally, the study has eventuated 30 from 50 basic design students who can attend to the interview guide. Subsequently, each 30 students have three projects which are Name-Poster, 2D-Pattern, and 2D-Organization.

### **3.2.2. Interview Guide**

Interview guide was required to the 30 participants at the end of each submitted projects. The guide is based on one important question, which asks the basic design students' colour decision criteria. However the guide is supported by some other questions in order to expand the main question. Subsequently, the interview guide comprises of four questions which aim to clarify the reasons and decisions of the students about the colours in their projects. (Appendix A.1) and the same questions are asked in each project.

The first question, in the interview guide, is about the basic design students' reasoning of colour and their preferences. The main purpose of this question is to uncover the colour preferences, likes or pleasantness, of the students. However,

harmony, contrast, and legibility, which are formal aesthetic values, are also the reasons for the selected colours. The second question is about to ascertain the meanings of colours, relying on symbolic meaning and symbolism of colour that the students used in their projects. The third question is about the compositions of colours which are aimed at discovering the students' colour combination decisions which depend on the theme and the concept of the projects or thematic attitudes, systematic attitudes, colour schemes, colour harmony principles, and colour contrasts. Last question is about the final composition of the two-dimensional projects that remind the students of something, which refers to the symbolic and associational meanings. The second and the last questions relate more on the symbolic aesthetic values than the formal values.

The criteria below are derived from the developments of an aesthetic experience in human nature. Preferences and symbolic attitudes include sets of personal, subjective and intuitive values. Preferences deal with likes, pleasantness and arousal, symbolic values refer to connotative and associational meanings and attributions, which may be justified in socio-cultural environment. Formal attitudes depend on Gestalt theory of principles and reasoning in design. Due to the dependence of the theme or the concept of the projects on the principles of organization, thematic attitudes of colour decisions are considered as analytical decisions. Systematic attitudes carry on visual thinking and reasoning in colour design by colour theories and colour harmony principles. Subsequently, formal, thematic, and systematic attitudes are not arbitrary; they depend on scientific, theoretical and analytical levels of design.

The answers are analyzed and generalizations were made under the headings of a certain criteria whether they exist or not.

The criteria are as follows;

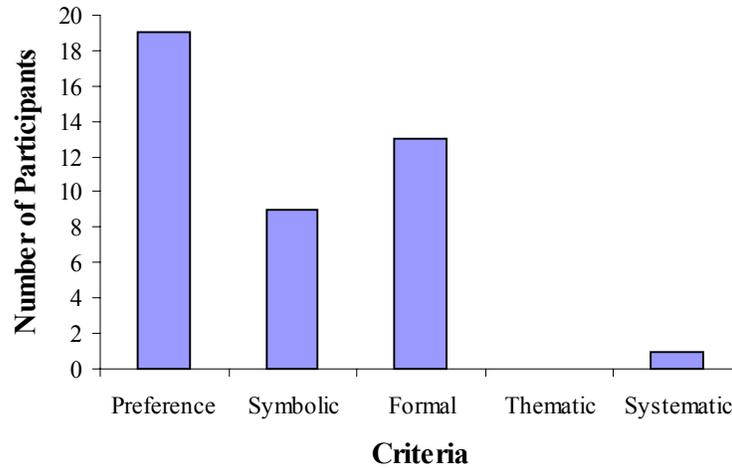
- |               |   |                                     |
|---------------|---|-------------------------------------|
| ▪ Preferences | } | Subjective/ Intuitive/ Heuristic    |
| ▪ Symbolic    |   |                                     |
| ▪ Formal      | } | Objective/ Knowledge-base/ Analytic |
| ▪ Thematic    |   |                                     |
| ▪ Systematic  |   |                                     |

### **3.3. The Analysis and the Comparisons of the Projects**

The data are collected from the answers of the interview guide of the three 2D projects. While analyzing the answers of students' colour decisions, it is examined in relation to the existence or not existence of the criteria. The analysis and comparisons are generated by the frequency and relative frequency distributions. Bar graphs are used in order to display the dispersion of basic design students' colour decisions of the two-dimensional projects.

#### **3.3.1. The Analysis of Colour Decisions on Name-Poster**

The data are collected from the answers of the basic design students' colour decisions on their Name-Poster projects. In this part, it is aimed at analyzing the frequency ( $f$ ) and relative frequency ( $rf$ ) distribution of the colour decisions of the students. The Figure 3.1 below displays the bar graph distribution of the basic design students' colour decisions on Name-Poster project.



**Figure 3.1.** Bar Graph for the Distribution of Students' Colour Decisions on Name-Poster

According to the Table 3.1., 19 ( $rf= 0.452$ ) of the students' colour decisions on their Name-Poster projects depend upon the students' colour preferences. These preferences are composed of their favourite colours. Following, the colour decisions of 13 ( $rf= 0.309$ ) students depend on formal approaches. These formal attitudes on Name-Poster have been divided into three categories, contrast, legibility, which depends on the figure-ground relationship, and harmony. Also within these categories 5 of the students' decisions were based on contrast, 5 of the decisions were based on legibility and 3 were based on harmony. In addition 2 of the students decided to use contrast and legibility together. Afterwards, 9 ( $rf= 0.214$ ) of the students have conscious associational and symbolic attitudes towards colour decisions on the project. Associational and connotative meanings comprise of relevance to their names or their favourite objects and notions, and symbolic attitudes being related to symbolic meanings of the colours. Only 1 ( $rf= 0.024$ ) student has the

systematic attitude towards colour decision and there is no thematic approaches are observed.

According to the results of the answers of the interview guide, the evaluation table of the colour decisions distribute among preferences, symbolic, and formal criteria. The Table 3.1 shows the students' colour decisions on Name-Poster below. The numbers on the table, which are "1", indicates the presence, and "0", displays the absence of the criterion.

**Table 3.1.** The Distribution of the Students' Colour Decisions on Name-Poster

Colour Decisions on Name-Poster																															
Criteria	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	Total
Preference	0	0	0	0	1	1	1	1	1	0	1	1	1	1	0	1	0	1	0	1	1	1	0	1	0	1	1	1	1	0	19
Symbolic	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	0	1	0	1	0	1	1	0	0	0	1	9
Formal	1	1	1	1	1	0	0	1	0	1	1	0	1	1	0	0	0	0	1	1	0	0	1	0	0	0	0	0	0	0	13
Thematic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Systematic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>42</b>

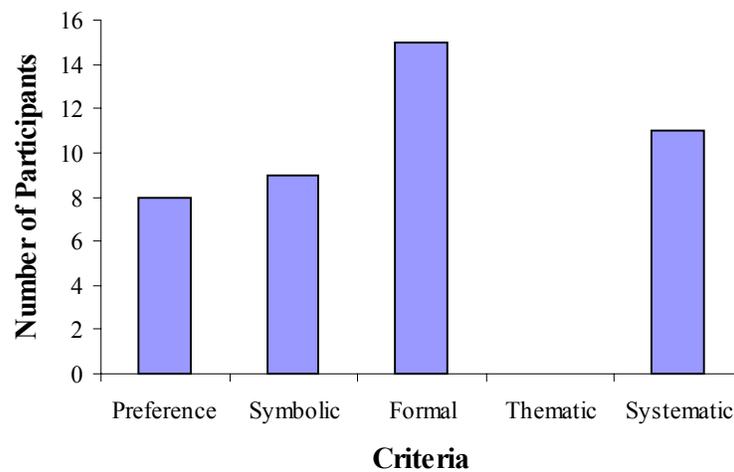
12 of the basic design students' colour decisions depend on two criteria namely preference and formal, and preference and symbolic, the rest of students' decisions were based on only one criterion. 16 of the students have only intuitive, subjective and heuristic attitudes in colour decisions of the Name-Poster project and 7 of them have only objective and analytical attitudes.

The students' colour decisions have the common distribution on the intuitive attitudes and heuristic system process of decision making. The three progressions of preference, symbolic and formal values and attitudes are observed. As a result, the basic design students' colour decisions more depend on their subjectivity and

intuitive attitudes than analytical attitudes towards Name-Poster which are the results of heuristic system processing in decision making. Name-Poster project was the first exercise in the basic design and the students' decisions and reasons are based upon only themselves particularly. It is the first step of the progression of an aesthetic experience; therefore, the decisions consist of preferences, symbolic meanings which are the heuristic (intuitive) devices.

### 3.3.2. The Analysis of Colour Decisions on 2D-Pattern

Generalizations were made from the answers of the interview guide. It is aimed at analyzing the frequency distribution of the basic design students' colour decisions on the 2D-Pattern projects. The Figure 3.2 below displays the distribution of students' colour decisions on 2D-Pattern.



**Figure 3.2.** Bar Graph for the Distribution of Students' Colour Decisions on 2D-Pattern

According to the Table 3.2, the colour decisions of 15 ( $rf= 0.348$ ) students depend on formal approaches. These formal attitudes on 2D-Pattern have been divided into four categories, colour coding, contrast, harmony and legibility. In this sense, colour coding is included, which depends on the grouping of the same colours with the same geometric shapes and leads to the legibility of the groups in the pattern. Also within these categories 7 of the students' decisions were based on colour coding, 5 of the decisions were based on contrast, 4 were based on harmony and 1 was based on legibility. In addition 1 of the student decided to use colour coding and legibility and 1 of the student use harmony and contrast together as one.

11 ( $rf= 0.255$ ) of the decisions based upon the systematic attitudes of colour harmony such as warm-cold combinations and primary colours. Following, colour decisions of 9 ( $rf= 0.209$ ) of the students have associational and symbolic attitudes towards colour decisions on the project. Associational meanings comprise of relevance to the patterns that the basic design students ascertain from nature and symbolic attitudes being related to symbolic meanings of the colours. 8 ( $rf= 0.186$ ) of the students' colour decisions on their 2D-Pattern projects depend upon the students' colour preferences which are composed of their favourite colours. At last there is no thematic attitudes are observed.

According to the results of the answers, the evaluation table of the colour decisions distribute among nearly the same frequency of preferences, symbolic, formal, and systematic approaches. The Table 3.2 shows the students' colour decisions on 2D-Pattern below. The numbers on the table, which are "1", indicates the presence, and "0", displays the absence of the criterion.

**Table 3.2.** The Distribution of the Students' Colour Decisions on 2D-Pattern

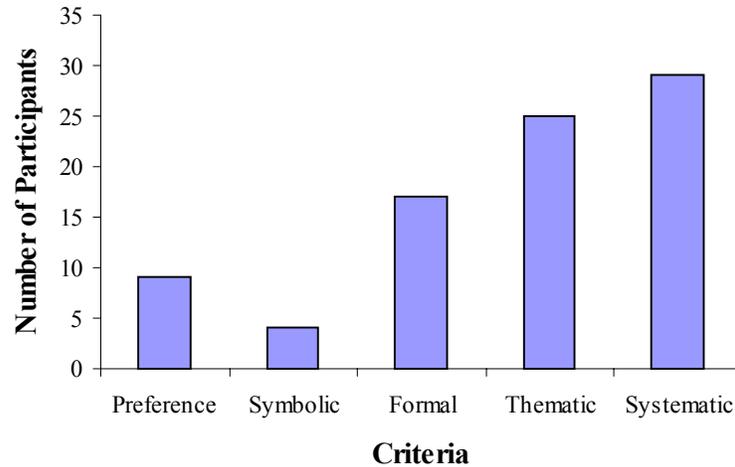
Colour Decisions on 2D-Pattern																																
Criteria	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	Total	
Preference	0	0	0	0	0	1	0	0	1	0	0	1	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	1	0	1	1	<b>8</b>
Symbolic	0	1	0	0	1	0	0	0	1	0	1	0	0	1	0	0	0	0	1	0	0	0	1	0	0	1	0	0	0	1	<b>9</b>	
Formal	0	0	1	1	0	1	1	1	0	1	1	1	1	1	1	0	0	0	0	0	1	1	1	0	0	0	0	1	0	0	<b>15</b>	
Thematic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	<b>0</b>	
Systematic	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	0	1	1	0	1	1	0	0	1	1	0	<b>11</b>	
<b>Total</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>43</b>

13 of the basic design students' colour decisions depend on two criteria namely preference and formal, preference and symbolic, symbolic and formal, symbolic and systematic, formal and systematic, and preference and systematic, the rest of students' decisions were based on only one criterion. 15 of the students have only objective and analytical attitudes in colour decisions of the 2D-Pattern project and 7 of them have only intuitive, subjective and heuristic attitudes.

In this case, the basic design students' formal and systematic attitudes are increase and their preferences and symbolic approaches are decrease in the 2D-Pattern project. As a result, the basic design students' colour decisions both depend on their subjectivity and intuitive attitudes, and analytical attitudes, which are the results of both heuristic and analytic system processing in decision making. Although the students have no proper theoretical knowledge about colour, they are conscious about reasoning while designing. There seems to be a dilemma in the dispersion of the colour decisions of the 2D-Pattern projects but observations point out that there is an increase and progression towards analytical attitudes of the students.

### 3.3.3. The Analysis of Colour Decisions on 2D-Organization

In this part, it is aimed at analyzing the frequency and relative distributions of the colour decisions of the students in the 2D-Organization projects. The Figure 3.3 below displays the distribution of students' colour decisions on 2D-Organization.



**Figure 3.3.** Bar Graph for the Distribution of Students' Colour Decisions on 2D-Organization.

According to the Table 3.3, 29 ( $r_f = 0.345$ ) of the basic design students have systematic attitudes towards 2D-Organization as colour theory principles and colour schemes. These colour schemes deal out monochromatic, analogous, direct complementary colour organizations. Following, 25 ( $r_f = 0.297$ ) of the design students have thematic approaches, which includes colour composition principles and the concepts the projects such as growth, geometric collusion, transparency, dominancy, asymmetric balance, central, axial, radial and grid-iron organizations.

17 ( $r_f = 0.202$ ) students' colour decisions depend on formal approaches. These formal attitudes on 2D-Organization have been divided into three categories, colour coding, harmony and contrast. Also within these categories 13 of the students' decisions were based on colour coding, which depends on the grouping of the same colours with the same geometric shapes, 3 of the decisions were based on harmony, and 2 were based on contrast. In addition 1 of the student decided to use colour coding and contrast together as one. 9 ( $r_f = 0.107$ ) of the students' colour decisions on 2D-Organization projects depend upon the students' colour preferences which are composed of their favourite colours. Lastly, colour decisions of 4 ( $r_f = 0.047$ ) of the students have associational meanings and symbolic attitudes towards colour decisions on the project.

According to the results of the answers, the evaluation table of the colour decisions distribute among formal, thematic, and systematic approaches of the criteria. The table 3.3 below demonstrates the dispersion of the 30 corresponding students to the criterion and their colour decisions on 2D-Organization. The numbers on the table, which are "1", indicates the presence, and "0", displays the absence of the criterion.

**Table 3.3.** The Distribution of the Students' Colour Decisions on 2D-Organization

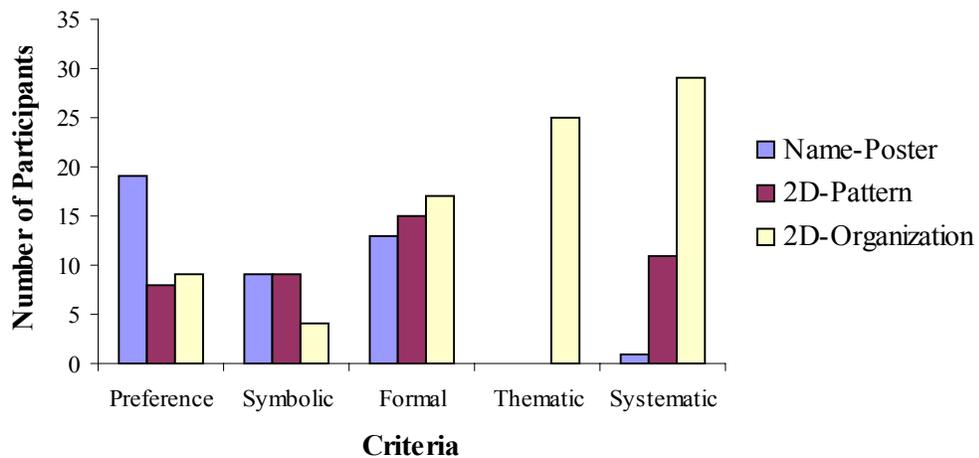
Colour Decisions on 2D-Organization																																
Criteria	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	Total	
Preference	0	0	0	1	0	0	0	0	1	1	0	0	1	1	0	1	0	0	0	0	0	0	1	0	0	1	0	0	0	1	9	
Symbolic	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	4		
Formal	1	0	1	0	1	0	0	1	0	1	1	0	0	1	1	0	1	1	1	0	1	1	1	1	0	0	0	0	1	17		
Thematic	1	1	1	1	1	1	1	1	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	0	1	1	1	25	
Systematic	1	1	1	1	1	1	1	1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	29	
<b>Total</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>	<b>4</b>	<b>4</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>84</b>

4 of the basic design students' colour decisions depend on four criteria – namely symbolic, formal, thematic and systematic, and preference, formal, thematic and systematic – 17 of the students' decisions are based on three criteria – namely formal, thematic and systematic, symbolic, thematic and systematic, preference, thematic and systematic, preference, symbolic and thematic, preference, formal and systematic – 8 of the students' decisions depend on two criteria – namely thematic and systematic, and preference and systematic – the rest of students' decisions were based on only one criterion. 18 of the students have only objective and analytical attitudes in colour decisions of the 2D-Organization project and it is observed that there are no only intuitive, subjective and heuristic attitudes. The students' colour decisions have the common distribution and progressive development to the analytical attitudes. Moreover, the analytic system processing of decision making is examined.

In this case, the observations point out that in the dispersion of the colour decisions of the 2D-Organization has an increase in the analytical attitudes – formal, thematic, and systematic – and a decrease in the intuitive attitudes – preferences and symbolic – of the students. As a result, the basic design students' colour decisions depend on their analytical attitudes which are the results of analytic system processing in decision making. Students have learned the basics and objective approaches of colour theory and colour harmony, and the basic elements and the principles of visual organization. They are conscious about reasoning and aesthetic experience.

### 3.3.4. The Comparisons of the Projects

All the three projects are analyzed and the proper progression among the projects of the Name-Poster, the 2D-Pattern, and the 2D-Organization is observed. The Figure 3.4 displays the frequency distribution of basic design students' colour decisions on three projects.



**Figure 3.4.** Bar Graph for the Distribution of the Projects

When the three projects are compared with each other, the projects are in accord with the progressive development and the improvement aesthetic experience in human nature. Development of aesthetic experience in human nature is made up of stages. These stages are preferences, symbolic values, formal, thematic, and systematic approaches. Preferences, symbolic values are heuristic inventions and formal, thematic, and systematic attitudes are analytical devices.

Design as a discipline, especially basic design, as discussed, aims to provide the elements and principles of organizations by means of reasoning and aesthetic

judgements. In this sense, the three projects are significant to test the students' cultivation and progression of aesthetic judgements with the processes of decision making in basic design. In the Figure 3.4 above this progression can be examined.

In Name-Poster project, basic design students' tendencies and colour preferences, and associational meanings and symbolic values of colour are observed preliminarily. Furthermore, there is not any thematic attitude and only one ( $r_f = 0.024$ ) of the students have systematic approaches. Preferences, favourites, associational and symbolic meanings are the responses to an aesthetic experience of children at the first stage (Parsons 308). These attitudes are the results of the heuristic system processing in decision making because they are based upon the students' subjective and intuitive attitudes.

In 2D-Pattern project, formal attitude in colour decisions is more dominant than any of the parameters that sum up the set of criteria. Parsons states that children of elementary school age tend to comment increasingly on formal aesthetics: questions of balance, harmony, contrast, repetition, grouping, and so on which are the properties of the second stage (309). Although the colour preferences and the symbolic values of the students' decisions are not abandoned, the frequency distribution of the 2D-Pattern project is not as high as it is in the Name-Poster. Additionally, the tendency towards systematic approach is observed. In this project, it is examined that basic design students' colour decisions both depend on their subjectivity and intuitive attitudes, and analytical attitudes which are the results of both heuristic and analytic system processing in decision making. Although basic design students have no proper theoretical knowledge about colour, they are

conscious about reasoning while designing in this process. There seems to be a dilemma in the dispersion of the colour decisions of the 2D-Pattern projects but observations and evaluations point out that there is an increase in the analytical attitudes of the students.

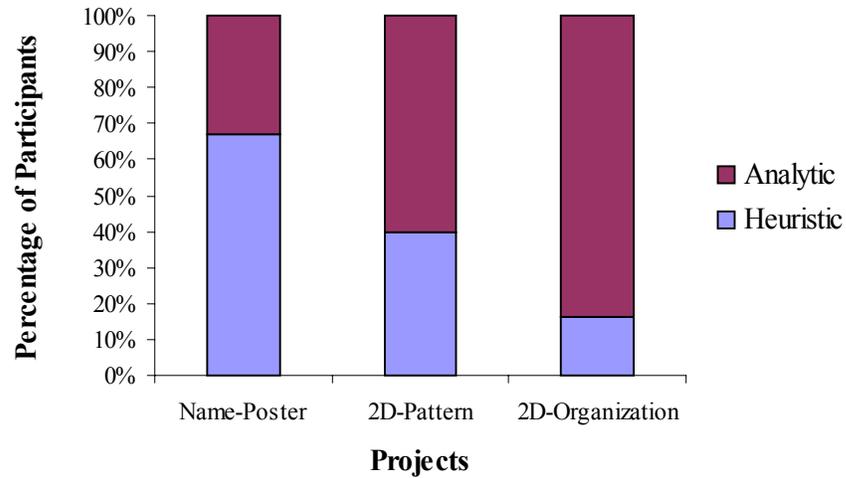
In 2D-Organization project, basic design students' symbolic attitudes towards colour and colours preferences become deserted. However, there seems to be an increase in thematic and systematic approaches. Additionally, formal attitudes of the students' are the highest frequency than any other projects. The students have studied basic approaches of colour theory and the basic elements and principles of organization of the visual representation. The attitude in this project refers to the third and last stage of the development of aesthetic experience. The theme and the expressive qualities of an object become central to response at the third stage. At the fourth stage, aesthetic qualities are thought of as qualities and systematises of an object itself, being in principle openly accessible and based on the perceptual or intentional aspect of an object (Parsons 310-313). These knowledge based approaches and analytical attitudes are results of the analytic system process in decision making.

A similarity is observed between the development in aesthetic experience and reasoning in human nature and the evolution that is experienced through out the colour education in basic design. The Table 3.4 below demonstrates the basic design students' total frequency ( $f$ ) and relative frequency ( $rf$ ) distributions of heuristic and analytical attitudes to the three projects.

**Table 3.4.** The Projects by Heuristic and Analytic Criteria

		<b>Projects</b>					
		<b>Name-Poster</b>		<b>2D-Pattern</b>		<b>2D-Organization</b>	
<b>Attitudes</b>	<b>Criteria</b>	<i>f</i>	<i>rf</i>	<i>f</i>	<i>rf</i>	<i>f</i>	<i>rf</i>
Heuristic	Preference	28	0,666	17	0,395	13	0,155
	Symbolic						
Analytic	Formal						
	Thematic	14	0,334	26	0,605	71	0,845
	Systematic						
<b>Total</b>		<b>42</b>	<b>1,000</b>	<b>43</b>	<b>1,000</b>	<b>84</b>	<b>1,000</b>

According to the Table 3.4, while 28 ( $rf= 0,666$ ) of the design students' colour decisions on Name-Poster project depend on heuristic attitudes, which are namely preference and symbolic, 14 ( $rf= 0,334$ ) of the students have analytical attitudes – namely formal, thematic, and systematic – towards the same project. Following, the total basic design students' frequency allocation on the 2D-Pattern project comprises of 17 ( $rf= 0,395$ ) heuristic attitudes and 26 ( $rf= 0,605$ ) analytical attitudes. On the 2D-Organization project, 13 ( $rf= 0,155$ ) of the students have heuristic attitudes and 71 ( $rf= 0,845$ ) of them have analytical attitudes. The analysis shows that, the basic design students' colour decisions on the Name-Poster project have the most heuristic attitudes and the least analytical attitudes. However, on the 2D-Organization project the students have the least heuristic attitudes and the most analytical attitudes of them all. The Figure 3.5 below compares the complete distributions of heuristic and analytical attitudes in the three projects.



**Figure 3.5.** The Segmented Bar Graph Comparing the Distributions of the Basic Design Students’ Heuristic and Analytic Attitudes within the Projects

Each bar above describes one project. The division of the bar into segments shows what percent of that project falls into each heuristic and analytical attitude.

Consequently, 67% of the basic design students have heuristic attitudes and 33% of them have analytical attitudes on the Name-Poster project. Following, 40% of the students’ colour decisions depend on heuristic attitudes and 60% of them have analytical attitudes towards 2D-Pattern project. The percentages the students’ colour decisions on 2D-Organization project are as follows, 16% of them have heuristic and 84% of them analytical attitudes. The Table 3.5 below displays the students’ colour decision criteria on the three projects, which are based on with or without analytical attitudes.

**Table 3.5.** The Basic Design Students’ only Heuristic and Supported by Analytic Attitudes in Colour Decisions towards the Projects

Attitudes	Projects		
	Name-Poster	2D-Pattern	2D-Organization
only Heuristic	16	7	0
supported by Analytic	14	23	30
<b>Total</b>	<b>30</b>	<b>30</b>	<b>30</b>

According to the Table 3.5, while the basic design students’ only heuristic attitudes – not supported by analytical attitudes – have an increase ( $f=16$ ) in colour decisions on the Name-Poster project and a decrease on the 2D-Pattern project ( $f=7$ ), it disappears on the 2D-Organization project. This means that all the students have supported their preferences and symbolic values with formal, thematic, and systematic attitudes within the case of 2D-Pattern ( $f=23$ ) and 2D-Organization ( $f=30$ ) projects.

However, in the Name-Poster project, the basic design students’ heuristic colour decisions ( $f=16$ ) are not sustained with analytical attitudes. Although the students have not had objective practice about colour besides their background accumulation, there are no proper differences between the criteria of only heuristic and supported by analytical attitudes ( $f=14$ ).

As a result, the examination and analysis point out that the knowledge and reasoning about colour changes and cultivates the basic design students’ attitudes and values because their preferences and symbolic attitudes decrease and their formal, thematic and systematic approaches increase. This decreasing and increasing level is best observed in 2D-Organization project. In this sense, it is concluded that the students’ colour education in basic design has a progression and cultivation their aesthetic values and analytical attitudes.

#### 4. CONCLUSION

Throughout the thesis, not only the place of colour in design as a design element, the relationship between colour and principles of visual composition have been clarified but also the role of colour in basic design education as an aesthetic value and as a part of a decision-making process have been discussed in order to evaluate the empirical study.

This study has been conducted to analyze and to understand the basic design students' progression in intuitive and analytical attitudes in colour decisions towards their two-dimensional projects. The preferences, aesthetic values such as symbolic and formal judgements, thematic and systematic attitudes of the students about colour have been considered as decision criteria. Preferences and symbolic values of the students have been evaluated as an intuitive, subjective, and personal attitude. However, formal, thematic and systematic approaches have been investigated as a knowledge-based and an analytical attitude. For the analysis, the study has been carried out with the 30 basic design students of Interior Architecture and Environmental Design Department of Bilkent University.

The process of cultivation and progression of basic design students' intuitive and analytical attitudes in colour decisions by means of aesthetic values has been evaluated in this study. These intuitive and analytical attitudes have been explained by the two systems in decision theory, namely heuristic and analytic system

processing in decision-making. The basic design students' intuitive attitudes of the are result of the heuristic system processing, and knowledge-based approaches are the outcome of the analytic system processing towards their projects. Accordingly, in the examination case of the study, the findings of the comparisons of the three projects can be summarized as follows:

- In the first project – namely Name-Poster – the basic design students' colour preferences have been observed preliminarily. Although the students have not had theoretical knowledge about colour design besides their past and background accumulations, their colour decisions have depended on formal attitudes such as harmony, contrast of colours and legibility of their names on the poster projects.
- The second project – namely 2D-Pattern – has based on a set of pattern studies. An investigation shows that there seems to be a dilemma in the dispersion of the colour decisions because the primary colours, white and black, and their mixtures have required use without any theoretical explanations. However there have been evaluated an increase in their formal attitudes, following systematic approaches, and a decrease in their symbolic values and preferences because the basic design students have been searching for reasoning in design.
- The third and the last project of the two-dimensional design, has depended on the principles of visual organization which is named as 2D-Organization project. In that project systematic and thematic attitudes have been examined preliminarily at the dispersion of the basic design students' colour decisions. According to the evaluation, there has a decrease in the intuitive attitudes of the

students, however their preferences, symbolic and associational meanings and values on colour have not abandoned.

Above summarized comparisons are the general findings of the three projects. In order to examine the progression the projects, Name-Poster/ 2D-Pattern, 2D-Pattern/ 2D-Organization are compared with each other. Accordingly, the findings can be summarized as follows;

- Besides the categories of formal attitudes such as harmony, contrast, and legibility in Name-Poster project the colour coding is included as another category, which depends on the grouping of the same colours with the same geometric shapes and leads to the legibility of the groups in the 2D-Pattern project.
- The basic design students' colour decisions have comprised of one, maximum two criteria in the both Name-Poster and 2D-Pattern projects.
- In the 2D-Organization project, different than the 2D-Pattern project, the basic design students' colour decisions have consisted of three, maximum four criteria of formal, thematic, and systematic attitudes.
- The heuristic criteria of preferences and symbolic values have not been inspected alone in 2D-Organization project. They have all supported by formal, thematic, and systematic attitudes of analytical criteria.

As a result, it is observed that, during the progression of colour education the tendency towards referring subjective and intuitive attitudes have a decrease and an increase towards knowledge-based and analytical attitudes. Additionally, this

development has shown a similarity with development in aesthetic experience in human nature and that of in the progression of the basic design students' colour decisions towards their three two-dimensional projects in basic design education. Subsequently, these findings may be inspected an approach to the discussions of colour education in basic design.

With the analysis, it has been concluded that in essence, there has a progression and cultivation in the attitudes of the basic design students' colour decisions in basic design education. Conditionally, colour is considered as an important subject matter in the education of architects and designers. "As many practicing designers [...] complained about the colour training in their early professional education, a comparison with the educational situation of today could be useful in many respects" (Willard 391).

Introductory design education needs to be regarded as one of the main getaways of communication of the latest findings in the research. At this stage, the initial interest for research findings can be most easily developed by not only increasing the total population of the empirical study but also analyzing the cultivation processes of the second, third and the last year students' intuitive and analytical attitudes in colour decisions of design education. The research can be expanded with the other design disciplines and universities as well. The relationship between the progression of the students' colour decisions and their successes on the projects can also be investigated for the further studies.

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## **APPENDIX A**

### A.1. Interview Guide for the Basic Design Students

This questionnaire aims at clarifying the reasons of the basic design students' colour decisions on Name-Poster, 2D-Pattern, and 2D-Organization projects of the 2002-2003 Fall Semester. The interview guide consists of four questions. Each question provides for the students to uncover the colour reasons, preferences, meanings, attitudes towards the three projects.

---

Name & Surname:

Male

Female

Age .....

---

1. Do you establish any criteria or reason when choosing your colours?
2. Do you try to create a colour composition while combining your colours?
3. Do your colours have a meaning for you?
4. Does the final colour composition remind you of anything?

## A.2. Basic Design Curriculum for the 1<sup>st</sup> Semester

### BASIC DESIGN CURRICULUM for 1st SEMESTER

1st week	2nd week	3rd week	4th week	5th week	6th week	7th week	8th week	9th week	10th week	11th week	12th week	13th week	
TECHNIQUES													
	RHYTHM	REPETITION	SIMILARITY	ROTATION	TRANSPARENCY	COLLISION	HIERARCHY	GROUPING					
FIELD ORGANIZATION PRINCIPLES													
	SYMMETRIC	CENTRAL	RADIAL	AXIAL	ASYMMETRIC BALANCE								
CONCEPTS													
	TRANSFORMATION												
2D PATTERN <small>abstraction from nature</small>	2D PATTERN	2D PATTERN <small>not a pattern</small>	2D COMPLEX ORGANIZATION	2D COMPLEX ORGANIZATION	2D COMPLEX ORGANIZATION	2D COMPLEX ORGANIZATION	2D COMPLEX ORGANIZATION	2D COMPLEX ORGANIZATION	2D COMPLEX ORGANIZATION	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>
		3D PATTERN	3D PATTERN <small>not a pattern</small>	3D COMPLEX ORGANIZATION <small>planar elements</small>	3D COMPLEX ORGANIZATION <small>planar elements</small>	3D COMPLEX ORGANIZATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>	3D SPACE GENERATION <small>planar elements</small>
							3D FORMS <small>abstraction from objects</small>	3D FORMS <small>compositions solid elements</small>	3D FORMS <small>compositions solid elements</small>	3D FORMS <small>compositions solid elements</small>	3D FORMS <small>compositions solid elements</small>	3D FORMS <small>compositions solid elements</small>	3D FORMS <small>compositions solid elements</small>
		COLOR	COLOR	COLOR	COLOR	COLOR	COLOR	COLOR	COLOR	COLOR	COLOR	COLOR	COLOR
			TEXTURE										

## **APPENDIX B**

## B.1. Name-Poster Projects



Student 1



Student 2



Student 3



Student 4



Student 5



Student 6



Student 7



Student 8



Student 9

Name-Poster Projects



Student 10



Student 11



Student 12



Student 13



Student 14



Student 15



Student 16



Student 17



Student 18

Name-Poster Projects



Student 19



Student 20



Student 21



Student 22



Student 23



Student 24



Student 25



Student 26



Student 27

**Name-Poster Projects**



Student 28



Student 29



Student 30

**B.2. 2D-Pattern Projects**



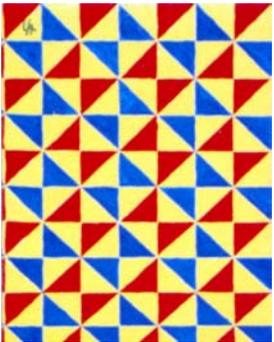
Student 1



Student 2



Student 3



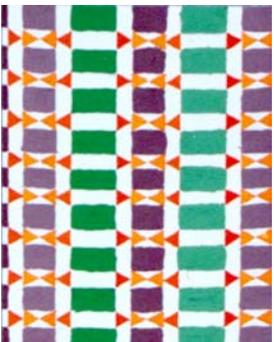
Student 4



Student 5



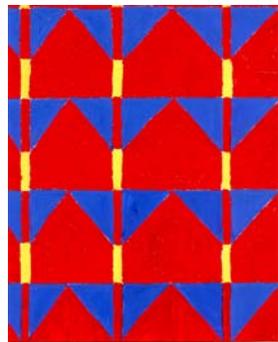
Student 6



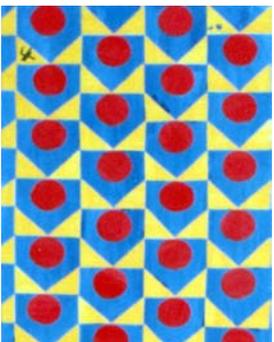
Student 7



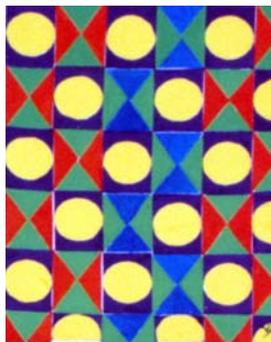
Student 8



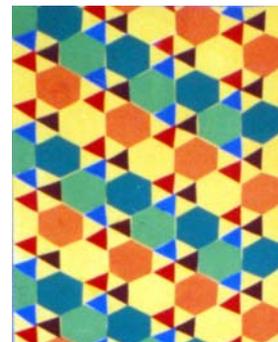
Student 9



Student 10

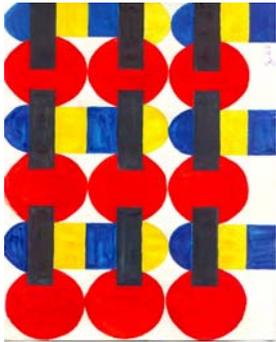


Student 11

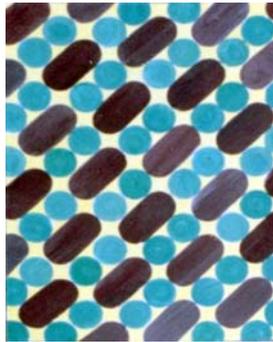


Student 12

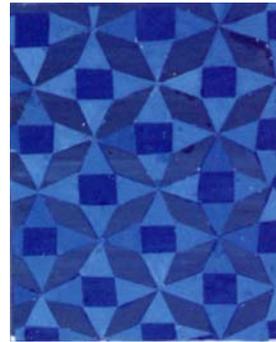
2D-Pattern Projects



Student 13



Student 14



Student 15



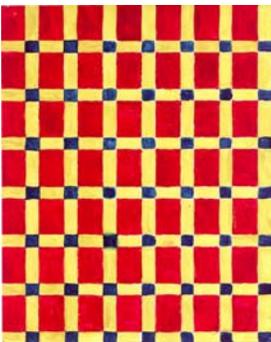
Student 16



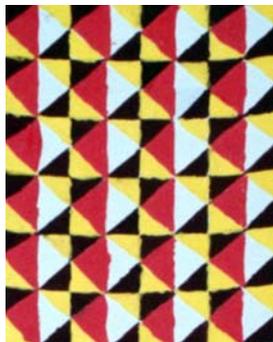
Student 17



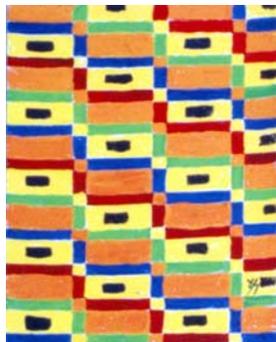
Student 18



Student 19



Student 20



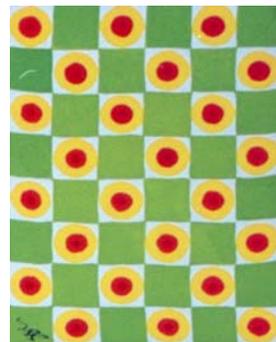
Student 21



Student 22



Student 23



Student 24

## 2D-Pattern Projects



Student 25



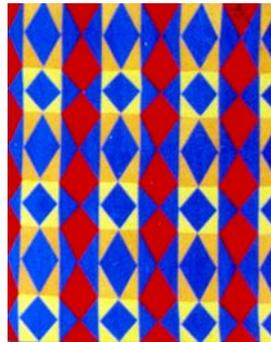
Student 26



Student 27



Student 28



Student 29



Student 30

### B.3. 2D-Organization Projects



Student 1



Student 2



Student 3



Student 4



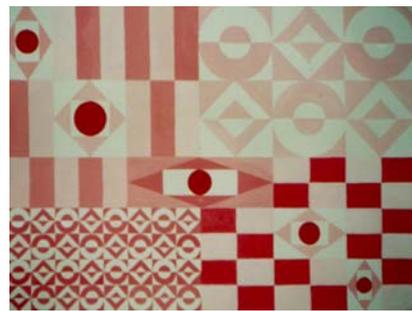
Student 5



Student 6



Student 7

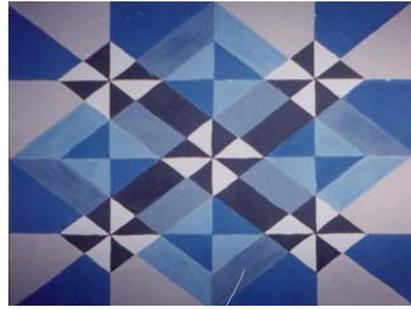


Student 8

## 2D-Organization Projects



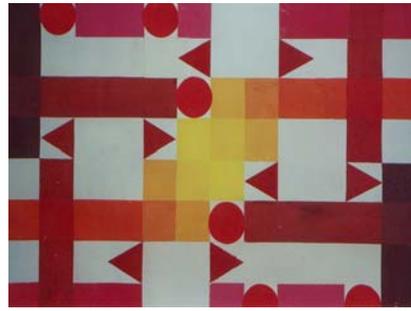
Student 9



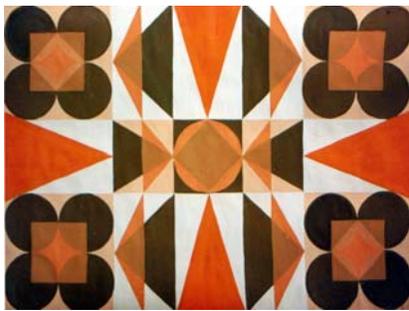
Student 10



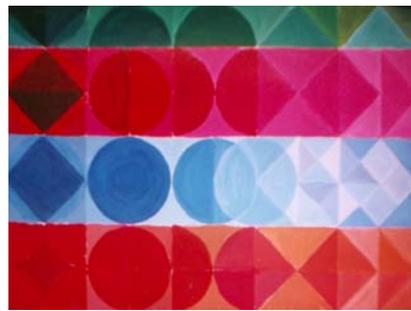
Student 11



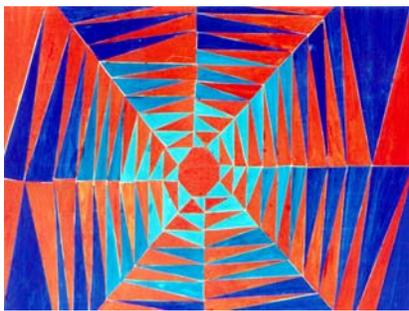
Student 12



Student 13



Student 14



Student 15

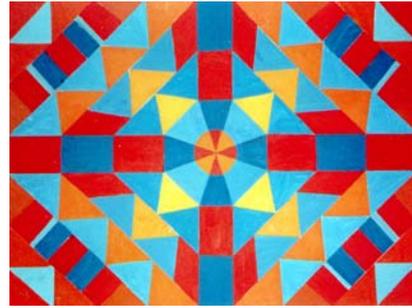


Student 16

## 2D-Organization Projects



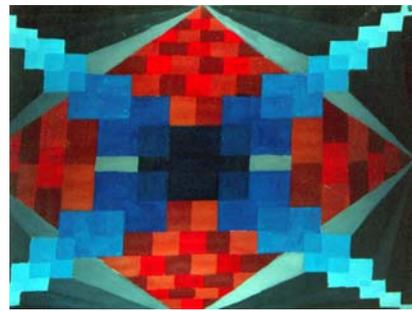
Student 17



Student 18



Student 19



Student 20



Student 21



Student 22

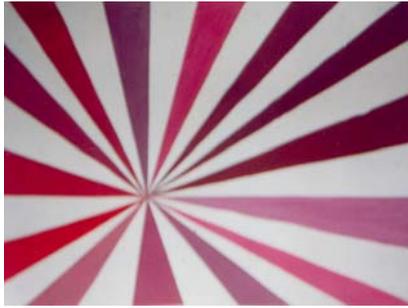


Student 23



Student 24

## 2D-Organization Projects



Student 25



Student 26



Student 27



Student 28



Student 29



Student 30