



Examining the Effects of Line and Point Elements on 3D Perception in Interior Architecture Basic Design I Course

Burcu Pehlivanoglu

Akdeniz University, Faculty of Architecture, Department of Interior Architecture, Antalya, Türkiye, burcupeh@gmail.com

Abdullah Hikmet Başaytaç

Akdeniz University, Faculty of Architecture, Department of Interior Architecture, Antalya, Türkiye, hikmetbasaytac@gmail.com

ABSTRACT

Point and line, one of the most basic elements of visual expression, is an important element of basic design education in Interior Architecture. As is known, the basic design course is referred to by similar names in different disciplines and seen as the first step of design education. The most important point that differs Interior Architecture from other similar disciplines is the need to allowing two-dimensional elements' ratio to be increased to the third dimension. In this process, the points form lines, lines form surface and surfaces form volume. The point and line studies carried out in the first year of the basic design education of Interior Architecture departments constitute an important beginning to recognize the design components and to perceive these components in the third dimension. It is assumed that the perception of three dimensions is limited because students can get enrolled in the interior architecture departments degree program if they pass the entrance exam rather than the aptitude test. The fact that the students had not previously been educated on the development of their abilities in volume and drawing attests to this argument. In this study, how line and point studies being the first ones in the First Class Basic Design I course of Akdeniz University Interior Architecture Department develop students' 3D perceptions will be evaluated and whether they associate their designs with basic design principles will be determined in accordance with their verbal communication skills.

Keywords: Point, Line, Basic Design, Interior Architecture, Education

INTRODUCTION

Points, dots and lines, which have distinct features and characteristics, are the main elements and starting points of the design. When we break down the design elements, a point is considered center or emphasis on that center while a straight line direction or axle in a drawing. The major characteristics of a dot are that it may be a point of focused attention or only a dark speck in a two-dimensional piece of arts. In two-dimensional drawings, the dots join together to form the line. Lines form the edges of the surfaces, allowing their ratio to be increased to the third dimension. The line is referred to "Trace, draw, calligraphy formed by drawing or by various means" in the Turkish Language Institution Dictionary. The word line comes from the Latin word graph (Sengir and Yücel, 2016; p. 479). According to Kandinsky, line is inwardly animated tension created by movement. A line consists of an infinite series of points. Lines appear at the edges of objects or where two planes meet. With modern technology, the line can also be drawn in digital media as well as with pen and brush. If we accept the line as the language of architecture, it frames the space to form the defined surfaces of any kind of space, creates edges, the outlines of objects, and introduces a boundary and definition to the architectural language. We see that line or point is used as a form of expression not only in interior architecture but in all areas of art. Lines and circles used foreshadow the dominant role they play in those works, as in Wassily Kandinsky's composition 8. In his work on understanding the inner character of art, Kandinsky tried to reveal the inner

essence with triangles, circles, lines and color. In the picture, the circle has taken on a dominant character compared to other forms.



Figure 1. Wassily Kandinsky, line and point elements he used in composition 8 (URL 1).

An example of the use of a line in a different character can be shown in Edvard Munch's *The Scream* painting. The artist has produced five versions of composition. He wrote his feelings in his diary: 'We were walking along the road with two of my friends. The sun went down and suddenly the sky turned a melancholic bloody red. The flaming clouds hung like blood and sword over the blue black fjords and the city. I was tired and stopped then leaned on the railing. I was dead tired and leaned against the railing. My friends walked on and I stood there, trembling with anxiety. And I felt a loud, unending scream piercing through nature.' It is seen that he strove for the emotions and experimentations of himself to make the focus of his work.



Figure 2. Straight line and curve line contrast in Edvard Munch's table. Lines here are used as symbol to depict a man's scream (URL 2).

In the education of Interior Architecture, which is an integral part of art, composition begins with the alignment of line elements and the relationship between line elements and their transformation into geometry. Geometry, on the other hand, form the basis for design with relations between geometric figures and forms and elements as well as the geometric rules based on the idea of ratios, angles, and transformations (Leopold, 2006; p.2). What forms the form in architecture is how far these lines are or how they intersect. That is, the motion of the line determines the geometry. The spaces between these geometries define the volume.

White spaces are the spaces and volumes we live in. Compositions created by the line are used to create a contour line. Angular, broken, or curved lines can create variety in design. Using curved or straight lines at regular intervals creates a texture, shows harmony, creating a sense of rhythm, which is one of the design compositions. The most dominant characteristic of the line is that it determines a direction and points to an axis. Just as in Edvard Munch's work *Scream* affects the frequency of the background *scream*, depicting the sky and water with waves lines, Zaha Hadid's *Beko Masterplan* structure take on curved shapes which have continuous lines. Likewise, just as the circle in Kandinski's *Composition 8* painting has become a dominant form on a two-dimensional painting, in Santiago Calatrava's *El hemispheric* structure, the circle becomes a hemispherical form in the third dimension, reinforcing the perception of the full sphere with the reflection of water and becoming the highlight element.



Figure 3. Wavy form created by Zaha Hadid in the Master Plan Structure using the continuity of the line (URL 3).



Figure 4. Santiago Calatrava's El Hemisferic structure took its name from the hemisphere. In order to be perceived as a full sphere, the reflection of water is needed in the night image (URL 4).

Horizontal and vertical lines communicate a feeling of rest, loftiness and spirituality that is compatible with the human tendency. In order to understand how we perceive design, we first need to know the nature of man's vision and the concepts of emptiness. By Emre Becer's definition, "All people have a strong innate tendency to horizontal and vertical forms. With gravity pointing directly towards the center of the earth, man's vertical position, which manipulates gravity, is the main reason for our tendency towards vertical forms. Vertical and horizontal forms are frequently used, especially in architecture, furniture design and town planning work." Piet Mondrian's paintings in which he used

horizontal and vertical lines inspired the facade of Gerrit Rietveld's House of Schröder. With the use of a fragmented cube and vertical horizontal forms, the structure is one of the cornerstones of Modern Architecture.

Spatial perception in basic design education is perceived and experienced in a very interesting way by students in the early years of Interior Design Education. Basic design studios serve an important purpose in developing creativity and shaping design, forming form. Basic design studios are a course that broadens student's mind and provides continuous research. As Sushama Parashar notes, "The design process is a thinking process, and the process adopted must produce creative thought. Creative thinking is the ability to transform vision into visuals" (URL-5). The goal of design training is to free the mind from the determined model and look at unknown paths.

The importance of Bauhaus Education School in the development and expansion of creative thinking in the field of education is undeniable. Bauhaus is a design school founded by Walter Gropius in 1919. Bauhaus aimed to combine art and craft to make use of technology and to make functional, simple and mass-produced designs over that period (Ozan, 2009; p.1).

Education at Bauhaus consists of three parts;

1. Preliminary education (basic art education),
2. Technical education (vocational basic art education),
3. Structural teaching (work related to the profession, project work)

Students received education here according to conceptual diagram which combines art and craft. The outer edge of the diagram called Vorkurs represents six months of pre-training. This training includes painting and introductory experiments on shape. The two inner circles represent three years of training. In the middle, the center of the diagram shows the progress towards building construction and engineering. It is aimed to learn architecture by combining art and craft, to blend design with technique and to complete the training towards the center.

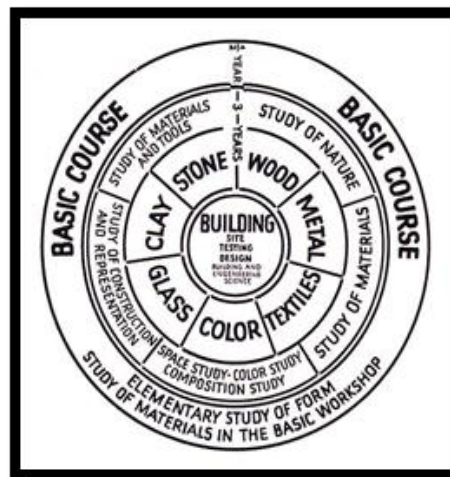


Figure 5. Training scheme designed by Gropius, founder and director of Bauhaus (URL 6).

Bauhaus heads a revolutionary tradition of 'hands-on education.' We see the effects of Bauhaus in the formation of the general scheme of design education in the basic areas of architecture. Acquainting students with the use of materials and the basic principles of design in the basic design training shows the importance of the relationship between master and apprentice in design education. There is a fact that the educator who gives basic design lessons should remember and increase his effort that the education at primary and high school level in Turkey is all about memorizing. Students who do not



come from this basis in the process of creation and who do not have sufficient knowledge about the development of their abilities such as questioning and imagining are shaped by educators.

The methodology of the basic design training developed with Bauhaus in new applications includes the introduction of improvisation techniques and the introduction of communication skills such as script writing into the design. One of the attitudes that students need to learn is the ability to communicate well. Each course should motivate students to be active in the classroom and also teach presentation skills in the classroom (Özkaynak and Ust, 2012; p. 142). In particular, it is necessary to teach speech techniques or to put forward projects or research that can improve the ability to express design. In this way, students can learn to read design as well as to write it beautifully and to express it verbally. This helps them develop a design culture.

1. PURPOSE AND METHOD OF THE STUDY

In college education, students from different backgrounds and levels of education with a lack of design knowledge are included in the basic design I course. The creation of a student-centered education system rather than an educator-centered system is the sine qua non of these courses (Cheng and Ou, 2016; p.1178). The need for a change in design education and the differentiation of old methods arises by the inclusion of technology and different materials in the process. The biggest obstacle to the ability to design in this process is that the student learns the process but does not understand why. Design has evolved over the past decade, but design education and more specifically design educators have been unable to keep up with this transformation. As a result, design students continue to learn the old methods and techniques. A designer needs to understand design processes, methods, and environments. At all these levels, the transaction is the same, but when the methods are slightly changed, the environment and the resulting product differ dramatically (Özkaynak and Ust, 2012; p. 141).

In architecture education, the student experiences a serious confusion when he/she encounters the design lesson and is unable to associate himself/herself with his/her habits from the past (Erkan, 2006; p.1).

In order for this association to occur, it is necessary to prepare appropriate conditions and to develop the student's creative thinking, to create the perception of three dimensions and to strengthen the ability to design together with the perception of form. The students who will design in the future need to increase their ability to design and also increase their ability to express this verbally and to read design. This study is the first application assignment of the basic design I course, so it is the first period in which the student encounters elements of interior architecture such as pencils, model materials. This is the stage where he does not yet have any knowledge about the design and how the design process can be handled. At this stage the student has not yet been given basic design principles, Gestalt theorems or other design teachings. In the first study with this line and point, the student was expected to design coincidentally in line with his/her own creativity capacity. A design was made for the students and efforts were made to develop their ability to express design in a way that would help them acquire their own voice at a very early stage of the education. The designs they made were advanced without much interference and with a certain respect for the student's relationship with the design. The aim of this study is to investigate whether the three dimensional forms found by chance with the line and point elements overlap with the basic design principles and to measure their awareness. The hypothesis is to seek answers to the following question: Do their studies without prior teaching of any design principles overlap with the basic design principles? Does it include basic design concepts such as (full repetition, variable repetition, sequential repetition), conformity (physical suitability, form suitability, style suitability), balance, contrast, symmetry, asymmetry, dominance? In this study, Akdeniz University Department of Interior Architecture 1st



class students were given two-dimensional drawings with dots and lines, asked to increase the composition they wanted to the third dimension, and then they were expected to write down the effect the three-dimensional models had on themselves. Students' own interpretations test whether they internally perceive basic design principles.

The stages and method of the study can be summarized as follows:

STAGES	→	METHODS
Giving theoretical knowledge. Introduction of drawing tools.		✓ Visual Presentation
4-week implementation process (they are required to work with point and line elements).		✓ Straight line, horizontal line, broken line studies, the use of free lines, the application of shading technique by punctuation of lines. ✓ Creation of compositions on 12x12 paper using mixed point and free line technique.
Transfer of two-dimensional drawing to third dimension.		✓ Selection of student studies. ✓ Enlarging selected compositions to 24x24. ✓ Transfer of design to third dimension and expression of design with model in third dimension. ✓ Materials such as white cardboard, white paper, black paper, corrugated cardboard, kraft paper, eva were used as model materials.
To analyze whether their work is compatible with the basic design principles.		✓ Students are required to write a composition and express the design.

The course was conducted with 4 faculty members and 75 works of the students were examined. 10 student works were selected as samples.

2. AKDENIZ UNIVERSITY INTERIOR ARCHITECTURE DEPARTMENT BASIC DESIGN I COURSE

The basic design I course is a 6-hour course per week. First of all, the students are introduced to the materials they will use. The aim is to focus on visualizing students from various backgrounds in line with their abilities. The course starts with a theoretical explanation of how basic design education began in the world. Students are divided into groups and four lecturers were each responsible for these groups. Homework is used to consolidate their learning.

The course consists of two main studies in total. The first study of the course is point and line. The aim of this study is to introduce the student to drawing and to enable them to produce compositions. The compositions they produce are raised to the third dimension without any design principles being taught. The course is designed to improve students' perception of the third dimension. The second study of the course is analogy and Mimesis theory immediately after the point and line study. Students design patterns through inspiration from nature or a living creature in nature and transfer the abstracted forms to the third dimension. In this section, the Basic Design Principles, Gestalt Theory, Fractal Geometry, Fibonacci Numbers, The Golden Ratio and Color Theorem are studied.



In this context, we can summarize the topics studied in the basic design I course as follows;

- ✓ Point and line studies, straight and curved lines, the creation of texture with the point, etc.
- ✓ Analogy and Mimesis Theory, producing form inspired by nature and transferring it to design,
- ✓ Color wheel, color information, warm and cold colors, complementary (contrasting) colors, secondary and tertiary complementary (opposite) color, composition, color, two-dimensional and three-dimensional surfaces,
- ✓ Form creation in design,
- ✓ Texture creation in design,
- ✓ Teaching basic design principles such as design principles, harmony, contrast, dominance, rhythm, datum, repetition,
- ✓ Teaching Gestalt Theory, Fibonacci Numbers, Fractal Geometry and the Golden Ratio and its application in design.

The Basic Design course in the interior architecture departments of Akdeniz University is a two-semester course. In the 1st semester, it focuses on abstract studies and form-building and in the second semester, the method changes a little more and this time the function, the relationship between the human environment and the context are involved in.

3. EVALUATION OF DESIGN CREATED BY POINT AND LINE STUDY

The active training system of design studios has evolved into a field in which ways of attaining knowledge are taught, rather than transferring knowledge. The basic design studios, which aim to increase the students' awareness levels, comprehension and ability to do, have become an experience environment that not only gives the students information, but also makes them think, question, and develop their creative potential (Onur and Zorlu, 2017; p.573).

The infinite diversity and imagination in the work done in basic design training enables the work to be structured according to the imagination and ability of each student. The studio environment is a dynamic process and it is expected to end the design in a four-week period within the framework of a specific date.

One of the most important elements of the basic design course is the development of the student's ability to take individual responsibility. It provides the basis for a system that will meet the expectations of the employer from the student in the future such as writing, regularity, systematic work, clean work. At the same time, the system of thinking needs to be flexible by giving the idea that there can be kinds of truths not one truth itself.

The first semester basic design I Course starts with two-dimensional drawings made with line and point studies. As the first study, students make vertical horizontal line compositions, writing, vertical horizontal studies with different pencils as a free application. If we classify the lines, we can define them as straight lines, broken lines and curved lines (Güngör, 2005; p.38). They are then expected to produce abstract compositions from these line studies.

Just as words are formed by arranging the letters and we can write compositions with these words, lines and points come together in interior architecture to form a composition. The creation of these compositions in a certain order also helps us to read that language.

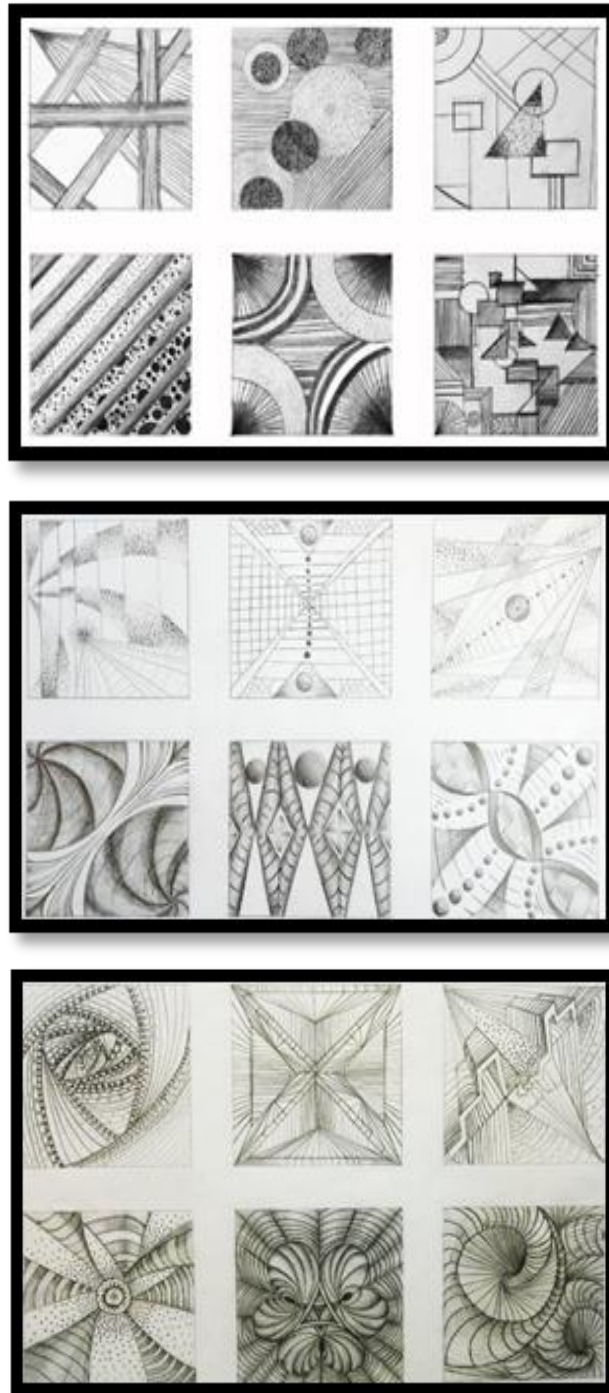


Figure 6-7.-8. The first stage of the study and the composition of the students using line and point.

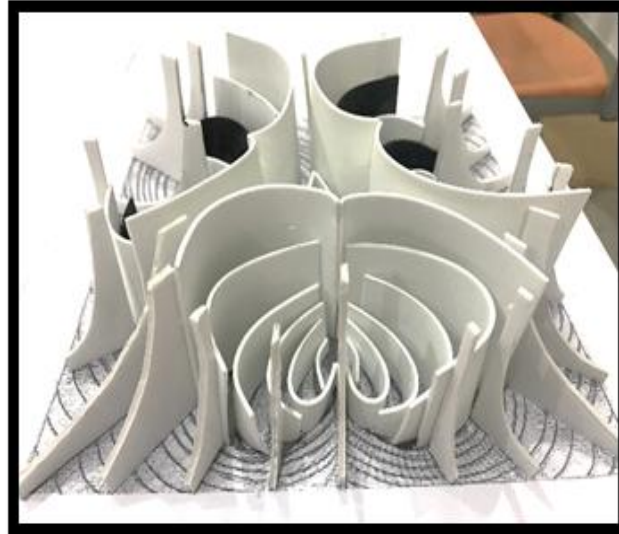


Figure 9. In the second phase of the study, one of the studies is selected and raised to the third dimension.

These compositions with two dimensions are transferred to the third dimension and the surfaces are transformed into masses with a volumetric value. A student who sees and perceives the relationship between two dimensions and the third dimension is more successful in developing design in project courses in the upper class. One of the tools providing this is a model. The model creates the perception that lateral surfaces must also have a form in the third dimension. Design is carried out by ensuring the unity of plan and geometry in the third dimension. The methodology that fundamentally improves the student's learning style and cognitive abilities tests whether they perceive design principles. Based on the evaluation of the students' own models, the findings of whether there is a design perception from the sentences used were evaluated. The main principle of basic design courses is that they help students uncover their creativity and improve spatial perception. The study examines how students who are new to the design process perceive this process and whether they can read the forms they create. It has been questioned whether the concept of visual literacy and the ability to transform its form into writing coincide with the basic design principles. In this context, 75 students' drawings and models were examined. The samples given were limited to 10 students.

3.1. Composition I

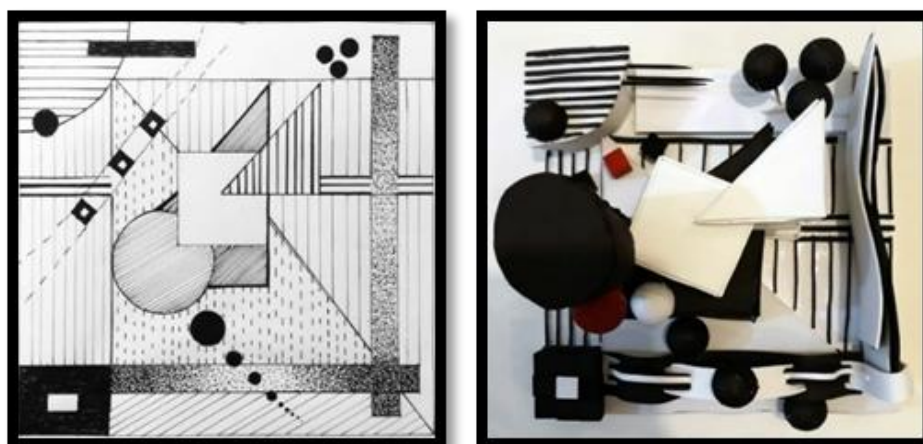


Figure 10. The composition created by the student using line and point and its transfer to the model

Student's Reading of Design: The emphasis of composition is at the midpoint. When the geometries in the middle were raised to the third dimension, the form was asked to create an effect as if it stood in the air. The circle is elevated to the cylinder, the triangular to the prism of triangles, and the square to the cube form. Two models were made in the study. It was tried to achieve a style unity between the side surfaces and the middle forms.

Educator Contribution: The student raised the drawing to the third dimension with two different models. Since the first model did not have enough composition integrity (unity and harmony from the basic design principles) between the geometry in the middle and the lines on the side surfaces, the second model was made. The second model is in balance in terms of form, colors and materials used. At this stage, the student has been taught to raise the design to the third dimension in a balanced way. Black and white color balance is available on the model. The student internally used the unity and harmony of the basic design principles.

3.2. *Composition II*

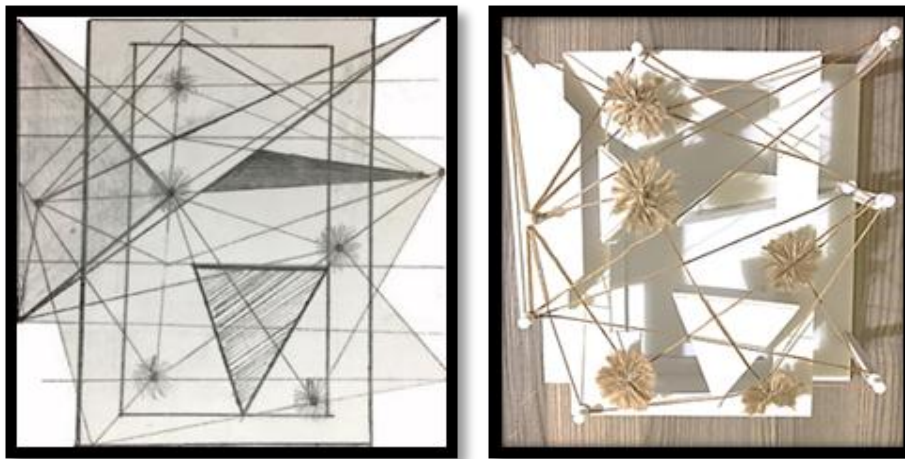


Figure 11. Learning light and shadow can be used as a design input in the composition and model that the student creates with the line.

Student's Reading of Design: Transitions between polygons, ropes are used; points are used at the intersection of the lines. Points form the line, lines form the polygons. The polygons that develop independently between the lines are emphasized. The triangles were desired to have different views from the top and side.

Educator contribution: The student says that the point has the most obvious meaning. Emphasis is made on the point element. The effect of light creates different shadows in the model.

3.3. *Composition III*



Figure 12. The student used lines in harmony, enabling the viewer's eye to move across the composition a fluid manner.

The Student's Reading of Design: Composition represents time. The time that shall pass, the time that I don't want this to end, and the time that pass slowly.

Educator Contribution: There is fluidity and rhythm in composition. The elements in the arrangement were implemented in form without much difference between them. The eye of the person looking at the design moves in a certain direction on the surface. This means that transitions are made between the elements in the design (such as line, tone, stain, texture) without creating any disconnection and visual continuity occurs. Ensuring visual continuity in design will provide rhythm from the basic design principles. In general, the expression of emotions is strong in design readings. Emotions are understood to be an important tool in design education.

3.4. *Composition IV*

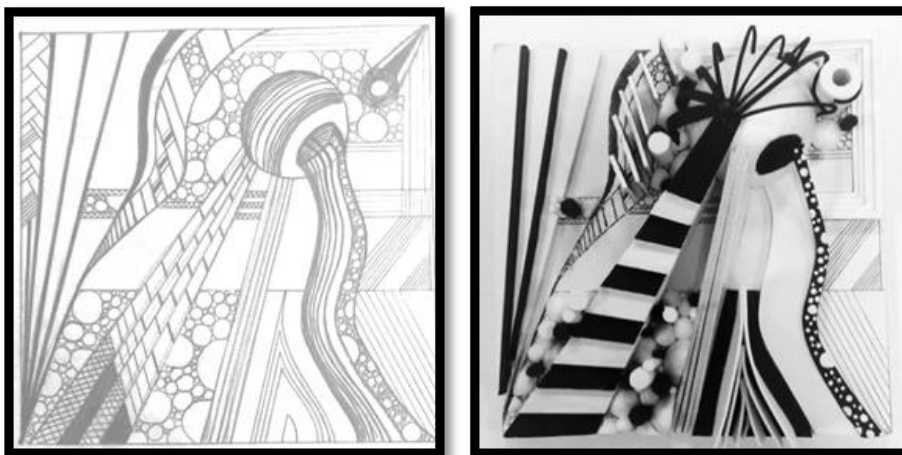


Figure13. Turning the circle into a sphere and becoming an emphasis element in design

The Student's Reading of Design: In the composition, the circle is placed in a central position and the other line elements flow towards it and the lines are given different heights to move in a direction such as stairs.

Educator Contribution: The lines represent an axis in the model. By using black and white contrast, the surfaces are differentiated and better read. Emphasis is placed on the element that is a circle in the plan and the lines are made to flow towards it. The circle

has been a focal point in design and attention has been directed towards it. This circle has been transformed into a sphere in the third dimension. The student said he could not portray a two-dimensional drawing in the third dimension. He emphasized that this practice was beneficial to him in this sense.

3.5. *Composition V*

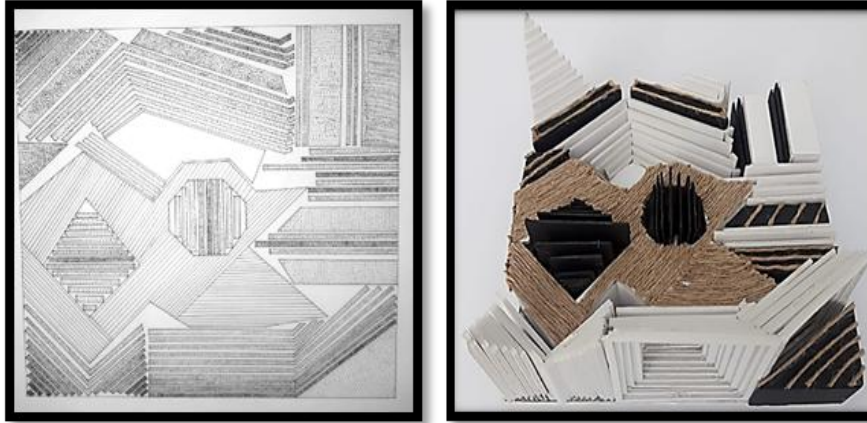


Figure14. Creating balance in design by using different materials.

The Student's Reading of Design: While raising the two-dimensional pattern to the third dimension, it is aimed to perceive the line in the third dimension by repeating the line on the side surfaces of the model. Some lines have created mass and some lines have been highlighted with the help of rope. A balanced use of the material has been achieved by creating diversity in the material.

Educator Contribution: Lines form a rhythm with their bumpy forms. The use of ropes at different points created balance in composition.

3.6. *Composition VI*

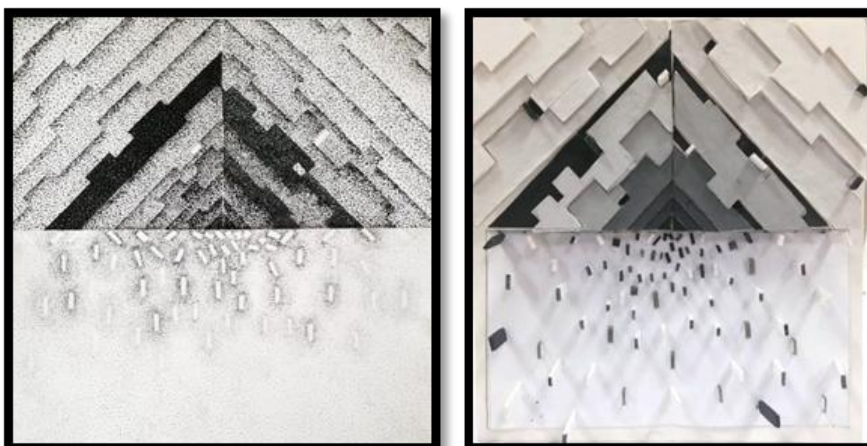


Figure 15. Asymmetric balance has become more understandable using third dimension, black and white and grayscale.

The Student's Reading of Design: The composition is divided into two parts. The lines are above and the points are below. The second surface, which consists of only points, has been transformed into a line element in the third dimension.

Educator's Contribution: The line is used with the point in the upper part of the composition. When light hits the lines in the lower section, the shadow completes the

line. Since elements of different sizes and forms are used to create visual equality in the third dimension, asymmetric equilibrium can be mentioned. A dynamic balance has been established between asymmetric balance and visual elements that are not dissimilar or equivalent to each other.

3.7. *Composition VII*



Figure 16. Linear fluidity in design, harmony of different forms.

The Student's Reading of Design: Everything is in balance so that parallel lines do not overlap. There are different forms of harmony. Different forms and materials were used. But it is still perceived as a whole.

Educator Contribution: Black spots were used in a balanced way in composition. Each piece is independent of each other but does not compete with each other. There are points of emphasis (dominance) in some areas but there is still no mention of an unbalanced dominance. The harmony of different forms, moving elements in the line were used in the third dimension harmoniously, regularly and in balance. This allows us to perceive the design with holistic care at every point.

3.8. *Composition VIII*



Figure 17. Color contrast, the use of straight curve line contrast with rhythm.

The Student's Reading of Design: Straight lines represent life, while curved lines represent emotions and ups and downs in life. The form is divided into two by an oblique line. It is based on the idea that there is an evil for every good. Thought is concentrated

in the middle and this represents the inner world of man. This representation is narrowed down by steep lines of wood. The inside is our emotions; the flat forms are the ones we project outwards. When we are in chaos, what we are projecting out is different.

Educator Contribution: The principle of contrast has been utilized. This is color contrast and form contrast. The form is fluid and in balance. In addition, a free rhythm can be mentioned in the design. Repetition of form increases readability, but at the same time, when used with the principle of contrast, stasis and monotony are eliminated.

3.9. *Composition IX*

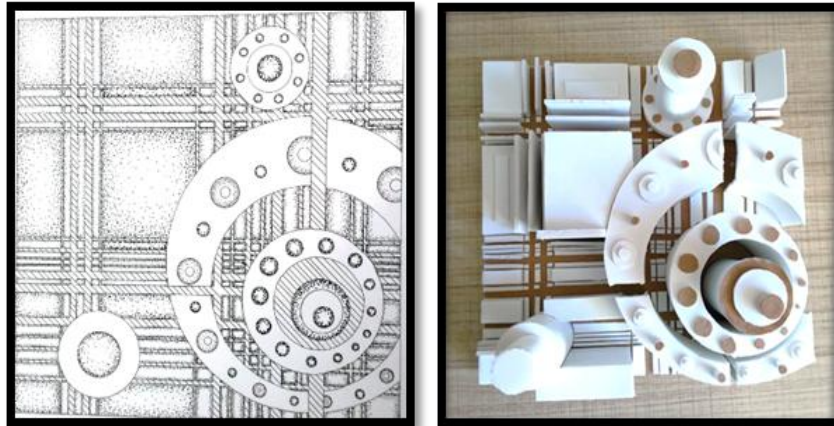


Figure 18. Use of the snail form as an emphasis element.

Student's Reading of Design: Clear geometric forms are used. The circles are turned into cylinders and are intended to balance the dominance within the snail. The lines and cylinders have come together appropriately.

Educator Contribution: The form is asymmetric and the shape of the snail formed from the points is the point of emphasis (dominance) of the model. The point of emphasis is the part that is desired to draw attention to in the design. This can be in a color, size, or shape. In this study, we see that the snail form is the focal point.

3.10. *Composition X*

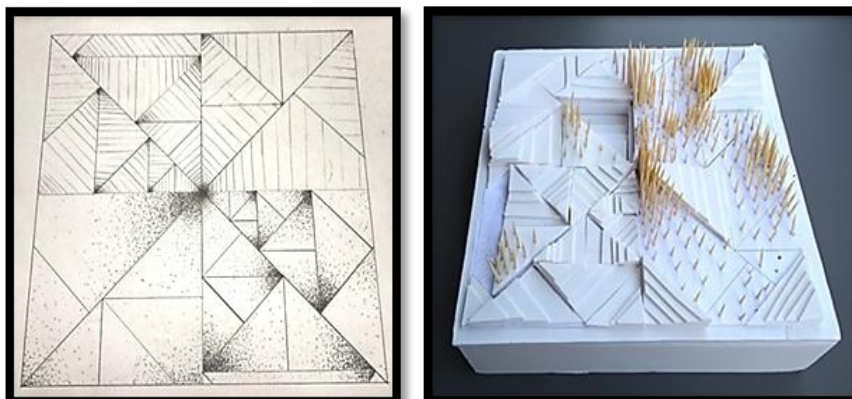


Figure 19. Use of point and line in a certain balance, variance again.

The Student's Reading of Design: The lines represent layers, and the points are expressed with toothpicks. These two forms are clearly separated from each other. But as a result of the fact that the two sides amount to the same thing, the definite



distinction between them is occasionally violated. And they overlap each other. This means order within the universe in disorder.

Educator Contribution: Variable repetition, balance and unity from basic design principles were used in composition. We call repetition variable as repetition where there are small differences, although they are identical to each other. In this type of repetition, the difference in measurement, format, direction, or sequence forms constitute variable repetition. Variable repetition is less monotonous and more remarkable than full repetition.

4. RESULTS

The biggest problem in Interior Architecture basic design education is the development of the student's three-dimensional thinking. A good evaluation of the creative process in basic design course affects the student's success in project courses in later years.

Drawings and models created with a visual language were expected to be converted into written language in a composition. Developing the ability to see with the eye and write about it pushes the limits of the student's ability to understand design. Combining visual language with reading; visual literacy is considered to be an important teaching tool. The study examined the drawings and models made by 75 students and found that 2/3 of the students succeeded in raising the drawing to the third dimension and creating the volume.

Since it is the first work and they cannot fully reconcile it with the basic design principles, it is seen that they express the effect of the point and line on themselves by adding their feelings in the composition. So the effect of form can be attributed not only to seeing but also to the emotions it creates on it. While creativity is a subject of great debate whether it is an innate talent or a skill acquired later, it is observed that students who are accidentally left to their own devices can develop their ability to see and express what they see through the guidance of the educator. It is understood that they can intuitively perceive basic design principles.

Students are expected to express their creations in words, no matter how challenging the design process. In future relations with the client they need to express the projects they create verbally. The texts have a decisive power over how we perceive, imagine, and consequently act on the world around us. As a result, language is the main component of the thinking process.

Making design practical is connected with the skills of future design students to transfer abstract thinking into practice and to explain this. The use of verbal, emotional and visual data together instead of tired exercises without knowing for years what he was doing and what he was creating enables the development of a new design teaching practice.

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AUTHORS

Burcu Pehlivanoglu

She completed her bachelor's (degree) program at Bilkent University Department of Interior Architecture and Environmental Design. After completing his master's degree in Interior Architecture and Environmental Design at Hacettepe University, he worked for 3 years at Korçelik, Turkey's first office furniture factory in İstanbul. While working there, she received her second master's degree in Business Administration from Yıldız Technical University. She then completed her art proficiency study at Mimar Sinan University's Department of Interior Architecture. She is currently working as a lecturer in the Department of Interior Architecture at the Faculty of Architecture, Akdeniz University.

Abdullah Hikmet Başaytaç

He graduated from Marmara University, Department of Interior Architecture in 2005. Beside his academic education, he also worked in restaurant design, fair design, housing, and furniture design and also gained field experiences in design offices. He worked on corporate identity and brand strategies in the Department of Interior Architecture at Marmara University, Institute of Fine Arts and wrote his master's thesis. He started working as a research assistant in 2008 and continued to work as a lecturer at Doğuş University in 2010. During this period, organized various workshops on urban furniture, belonging within the public sphere, etc. Başaytaç continues with his research as a PhD student at Mimar Sinan Fine Arts University and has been working at the Department of Interior Architecture, Faculty of Architecture, and Akdeniz University since 2015.